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STEEL

For forty-eight Years—IRON TRADE REVIEW

PRODUCTION • PROCESSING • DISTRIBUTION • USE

The Week in Perspective

STOPPED at mid-field and now being driven slowly back over territory covered in the last six months, business is being told by Washington that if it can only hold that line until March (p. 17) the touchdown drive will once more surge ahead. With an increasingly hard-boiled coach on the bench in the form of the federal government—hard-boiled in the sense of jail threats toward NRA chiselers and pressure on executive salaries—business is trying its best to "take it," but last week steel, in a key position, was thrown for a loss of 6 points, bringing the national operating rate (p. 14) down to 34 per cent. Field generals are signaling the sidelines for reinforcements in the form of government-sponsored rail buying and increased public works expenditures, but these substitutes are still engaged in warming up.

Interpretations Smooth Path of Steel Code

The 90-day baptismal period of the steel code being officially terminated Nov. 19, the industry is speculating (p. 49) upon what changes may be in prospect for that date. Already American Iron and Steel institute directors, in whose hands the code reins rest, have handed down 26 resolutions or interpretations of the document, the latest being the sanction of concessions on pig iron prices (p. 12) to permit domestic cast-iron pipe makers to compete on 25,000 tons of pipe for installation at Mexico City. Bids are now in but awards have not been announced. . . . Resolution 13 comprised (p. 12) a clarification of concessions allowable to consumers of steel in the Detroit district.

Labor Still the Fly in the Ointment

Speed was also evidenced in the settlement of labor difficulties at the plant of a West Virginia steelmaker, where striking workers returned to their jobs a week ago, although, newspaper headlines to the contrary, formal recognition of a labor union (p. 11) was not granted. . . . The President, it is said, was pleased but not satisfied (p. 18) with the report that employment in September had recovered 40 per cent of the loss since 1929, but payrolls only 25 per cent. . . . Automobile builders, with new models about ready for the production department, are uneasy (p. 19) lest unrest be fomented among laborers on production lines. . . . October production of cars is seen (p. 19) dropping to below 150,000, still about three times the total for the same month last year.

Government-Backed Standards Get the Call

Although the budget for government standardization work has been curtailed sharply, representatives of industries interested in this work by a recent resolution have voiced their preference (p. 12) for standards developed by the federal bureau of standards. . . . Non-standardized steel houses were accorded a more promising future than the mass-production type of dwelling (p. 29) by a speaker at a meeting of steel constructors in Chicago last week. A German engineer, also commenting on steel houses, pointed out that financial aid from the German government has promoted the development (p. 30) in that country. . . . Steel mill engineers, meeting in Pittsburgh, were shown convincingly (p. 32) that technical progress in mill equipment has been unabated by years of depressed operations.

Broadens Field for Furnace Brazing

Continuous electric furnace brazing, a process of comparatively recent development, is an economical and efficient method for assembly of miscellaneous steel products used in a wide range of industries. Equipment has been developed (p. 25) for maintaining at low cost a nonoxidizing atmosphere in the brazing furnace, thereby widening the field of application of the process. . . . Improvement in free-cutting quality is the feature (p. 40) of a newly-developed bessemer screw steel. . . . Between 25 and 30 pounds of zinc, in both rolled and cast forms, is used (p. 41) on the average automobile today. . . . Automatic transfer of axle assemblies from production line to loading dock is accomplished (p. 30) by a specially-designed monorail.

TELEGRAM

H. J. PAYNE, SECRETARY
ASSOCIATED BUSINESS PAPERS
UNION LEAGUE CLUB, CHICAGO

OCTOBER 17, 1933

ON THE OCCASION OF THE SESSION OF THE ASSOCIATED BUSINESS PAPERS TOGETHER WITH THE NATIONAL CONFERENCE OF BUSINESS PAPER EDITORS, MAY I SUGGEST THAT YOU GIVE EARNEST ATTENTION TO THE SITUATION NOW EXISTING IN THE CAPITAL GOODS INDUSTRIES.

YOUR GROUP IS INFORMED AS TO THE VAST AMOUNT OF PURCHASING OF DURABLE GOODS WHICH HAS BEEN DEFERRED DURING THE PAST THREE YEARS. YOU UNDERSTAND THAT THE INDUSTRIES PRODUCING SUCH GOODS REPRESENT MORE THAN HALF OF THE COUNTRY'S NORMAL BUSINESS.

WE ARE AT A CRITICAL TIME IN RECOVERY. CONFIDENCE OF THE GREAT MASS OF OUR PEOPLE IN THEIR OWN FUTURE AND IN THE FUTURE OF THE COUNTRY HAS BEEN RESTORED. MEN ARE GOING BACK TO WORK; PAY ENVELOPES ARE FATTER. WE MUST INSURE THE UPWARD TREND BY MAKING IT PRACTICABLE FOR PURCHASING OF DURABLE GOODS TO BE RESUMED AGAIN SO THAT THE INDUSTRIES THAT MAKE SUCH GOODS AND THE WORKERS NORMALLY EMPLOYED IN THOSE INDUSTRIES MAY AGAIN HAVE AN INCOME.

IT IS WITHIN YOUR PROVINCE TO CONTRIBUTE MIGHTILY TO THE RELEASE OF THE DAMMED-UP DEMAND FOR MACHINERY AND EQUIPMENT AND OTHER GOODS REQUIRED BY MILLS AND FACTORIES AND OUR TRANSPORTATION SYSTEMS FOR FULLY EFFICIENT OPERATIONS UNDER TODAY'S CONDITIONS.

AS YOU HAVE HELPED THE NATIONAL ADMINISTRATION IN ITS EFFORTS TO DATE, YOUR GOVERNMENT NOW ASKS YOU TO GIVE SPECIAL CONSIDERATION TO WAYS AND MEANS FOR REVIVING THAT PART OF THE NATION'S INDUSTRY THAT IS STILL SICK.

HUGH S. JOHNSON,
NATIONAL RECOVERY ADMINISTRATION

Union Is Not Recognized in Strike Pact; the Week's News

STILL an open shop and not merely another lodge of the Amalgamated association, the Weirton Steel Co. last week snapped back to 50 per cent operations, with 6 out of 12 open hearths at Weirton, W. Va., operating, others being warmed up, and one out of two blast furnaces there blowing.

At its three Weirton district plants, some 10,000 men were at work. Reflecting the resumption at Weirton, steelmaking operations for the Wheeling district lifted 2 points to 47 per cent last week and will go to 50-55 per cent this week despite restricted schedules at the plants of another producer.

Settlement of the strike at Weirton was officially effected Oct. 16 when representatives of the company, including E. T. Weir, chairman of the National Steel Corp., of which Weirton is a subsidiary; George M. Humphrey, chairman of the National Steel executive committee; and Earl F. Reed, counsel for the Weirton company, appeared before the National Labor board in Washington as a gesture toward harmony and cooperation.

Results Misinterpreted

Representatives of the company maintained that strike leaders called out men without making any demands or without any notice. Representatives of the Amalgamated association lugged in four suitcases purporting to be full of signed pledge cards of Amalgamated members.

Half truths, which indicated that the Amalgamated had been recognized, and that the National Labor board won a signal victory over recalcitrant steel magnates, appeared in a portion of the daily press. The actual settlement was:

It is agreed:

(1) That the strike now pending in the Weirton Steel Co. be called off immediately.

(2) The striking employes are to be permitted to return to work without discrimination, prejudice, or physical examination.

(3) An election will be held during the second week of December under the supervision of the National Labor board, the procedure and method of election to be prescribed by the board.

(4) The employes shall be permitted, as guaranteed by the provisions of section 7(a) of the national recovery act, to select representatives of their own choosing, and the employers agree to bargain collectively with the representatives so elected.

(5) In the event that any dispute arises out of this agreement, it is agreed that the same shall be submitted to the National Labor board for decision.

¶Somewhat similar misinterpretations of negotiations at Washington were calculated to credit steel companies owning so-called captive coal mines with recognition of the United Mine Workers and the check-off system.

Check-Off Is Qualified

Up to late last week, operators of these captive mines were standing pat on their proposal to deduct dues from pay envelopes of their miners, but only when specifically requested by the miners. Another week of negotiations passed, with United Mine Workers represented by Philip Murray, international vice president stationed at Pittsburgh, not yet formally accepting this settlement. At Washington, Gen. Hugh S. Johnson, NRA administrator, indicated that this settlement was satisfactory.

¶The National Labor board still was frustrated in attempting to force a settlement of labor troubles at the Edgewater, N. J. plant of the Ford Motor Co., it being maintained by Edgewater officials that demands for collective bargaining and wages would have to be referred to Ford officials at Dearborn, Mich. Headquarters of Henry Ford still were as silent on the labor board as on NRA.

¶Writing in his company's monthly magazine for employes, Frank Purnell, president, Youngstown Sheet & Tube Co., maintained that the employe representation plan of the company during the past 15 years has greatly improved employe relations and working conditions and fulfills all the collective bargaining requirements of NRA. Mr. Purnell, incidentally, is chairman of the labor division of the American Iron and Steel institute committee formed to enforce the steel code.

¶Closing the recent convention of the American Federation of Labor, William Green, president, claimed a membership of 3,926,796, of whom 2,526,796 are paying the federation tax. In the past year more than $50,000,000 was paid out in nonemployment and other benefits.

¶An NRA code for labor unions, similar to that for industries, is being considered in Washington to free organized labor from the menace of racketeers.

Railroads

TO RAILROAD Co-ordinator Eastman's proposal that producers of standard rails lower their price from $40 a ton to $35 or less in return for immediate business totaling 844,525 tons, a price of $38, it was re-

Acme Photo

AN INTERESTING DETAIL IN FRAMELESS STEEL HOUSE CONSTRUCTION: Sill plates anchored at the foundation are welded into an integral whole by means of portable acetylene equipment, in this structure being erected by the Wheeling Corrugating Co., at Wheeling, W. Va. Anchor bolts are cut by flame and welded to the sill. To the sill plates will be welded wall and floor sections of sheet steel. House designed by Charles Bacon Rowley & Associates Inc., Cleveland; construction details developed by the Wheeling company

ported last week, will be submitted.

Earlier in the week an official of a leading rail mill suggested the current price of $40 a ton as "about right" especially in view of the fact that one of the purposes of NRA is to insure a reasonable return to the manufacturer.

Three weeks ago, when he called representatives of the four producers of rails before him—United States Steel Corp., Bethlehem Steel Co., Inland Steel Co. and Colorado Fuel & Iron Co.—Mr. Eastman suggested separate bids, the lowest price to govern.

¶Until the rail matter is disposed of, the placement of 245,221 tons of track fastenings will be held in abeyance. The standardization program for fastenings has come a-cropper of patents and other matters, and for the present only standards for hole diameters and spacing in rail ends will be attempted for the 131 and 112-pound rail sections on which the American Railway Engineering association has reached an agreement.

Standards for drilling the ends of 131 and 112-pound rails are:

(1) Holes to be 1⅛ inches in diameter.

(2) Center of first hole to be 2½ inches from end of rail; center of second hole to be 6½ inches from center of first hole; if third hole is used its center to be 6½ inches from center of second hole.

(3) Height from base of rail to horizontal center line of holes to be:

(a) 3 3/32 inches for the 131-pound rail; (b) 2 7/8 inches for the 112-pound rail.

Institute

RESOLUTION No. 13 of the American Iron and Steel institute, permitting certain deductions to consumers of bars, sheets and hot-rolled strip in Michigan, has been clarified. On products sold per 100 pounds the deductions are so stated. The 20-cent deduction on cold-finished alloy bars is extended to users in eastern Michigan up to and including a 31-cent freight rate from Pittsburgh, while the 25-cent deduction on cold-finished bars, sheets and hot-rolled strip now applies also to the 31-cent zone. There is no mention of other districts, which had asked similar treatment. The essential part of revised Resolution No. 13 follows:

(*a*) On blooms, billets and slabs (alloy and carbon steel) for delivery within the switching limits of the City of Detroit, in the State of Michigan, a deduction not exceeding an amount that shall be Three dollars ($3) per gross ton less than the all-rail published tariff carload freight charges otherwise chargeable thereon pursuant to the provisions of Section 4 of Schedule E of the Code from the basing point on which such base price is based to said City of Detroit;

(*b*) On blooms, billets and slabs (alloy and carbon steel) for delivery at any place in the State of Michigan outside the switching limits of the City of Detroit to which the all-rail published tariff carload freight rate on steel bars from Pittsburgh, Pennsylvania, shall be not greater than twenty-nine cents (29c) per hundred weight, a deduction not exceeding an amount that shall be Four dollars ($4)) per gross ton less than the all-rail published tariff carload freight charges otherwise chargeable thereon pursuant to the provisions of said Section 4 from the basing point on which such base price is based to such place of delivery;

(*c*) On alloy steel bars (hot rolled and cold finished), and hot rolled carbon steel bars (merchant and concrete reinforcing) for delivery within the switching limits of the City of Detroit, in the State of Michigan, a deduction not exceeding an amount that shall be fifteen cents (15c) per hundred weight less than the all-rail published tariff carload freight charges otherwise chargeable thereon pursuant to the provisions of said Section 4 from the basing point on which such base price is based to said City of Detroit;

Bars in 29-cent Zone

(*d*) On hot rolled alloy steel bars, and hot rolled carbon steel bars (merchant and concrete reinforcing) for delivery at any place in the State of Michigan outside the switching limits of the City of Detroit to which the all-rail published tariff carload freight rate on steel bars from Pittsburgh, Pennsylvania, shall be not greater than twenty-nine cents (29c) per hundred weight, a deduction not exceeding an amount that shall be twenty cents (20c) per hundred weight less than the all-rail published tariff carload freight charges otherwise chargeable thereon pursuant to the provisions of said Section 4 from the basing point on which such base price is based to such place of delivery;

(*e*) On cold finished alloy steel bars for delivery at any place in the State of Michigan outside the switching limits of the City of Detroit to which the all-rail published tariff carload freight rate on steel bars from Pittsburgh, Pennsylvania, shall be not greater than thirty-one (31c) per hundred weight, a deduction not exceeding an amount that shall be twenty cents (20c) per hundred weight less than the all-rail published tariff carload freight charges otherwise chargeable thereon pursuant to the provisions of said Section 4 from the basing point on which such base price is based to such place of delivery;

(*f*) On hot rolled, hot rolled annealed and cold rolled sheets, hot rolled strip steel and cold finished carbon steel bars for delivery within the switching limits of the City of Detroit, in the State of Michigan, a deduction not exceeding an amount that shall be twenty cents (20c) per hundred weight less than the all-rail published tariff carload freight charges otherwise chargeable thereon pursuant to the provisions of said Section 4 from the basing point on which such base price is based to said City of Detroit;

(*g*) On hot rolled, hot rolled annealed and cold rolled sheets, hot rolled strip steel and cold finished carbon steel cars for delivery at any place in the State of Michigan outside the switching limits of the City of Detroit to which the all-rail published tariff carload freight rate thereon from Pittsburgh, Pennsylvania, shall be not greater than twenty-nine cents (29c) per hundred weight, a deduction not exceeding an amount that shall be twenty-five cents (25c) per hundred weight less than the all-rail published tariff carload freight charges otherwise chargeable thereon pursuant to the provisions of said Section 4 from the basing point on which such base price is based to such place of delivery; and

(*h*) On cold finished carbon steel bars for delivery at any place in the State of Michigan outside the switching limits of the City of Detroit to which the all-rail published tariff carload freight rate thereon from Pittsburgh, Pennsylvania, shall be not greater than thirty-one (31c) per hundred weight, a deduction not exceeding an amount that shall be twenty-five cents (25c) per hundred weight less than the all-rail published tariff carload freight charges otherwise chargeable thereon pursuant to the provisions of said Section 4 from the basing point on which such base price is based to such place of delivery.

¶Resolution No. 25 interprets Schedule G of the steel code concerning maximum rates of discount for early payment and maximum periods of free credit on products shipped from east of the Mississippi river to Pacific coast ports "as applying to such products which shall be shipped from such plants to or through any Pacific coast port to any place of delivery in the United States of California, Oregon and Washington or in the Panama Canal Zone or Alaska and which shall be invoiced from such plants."

¶Resolution No. 26 permits producers of pig iron to shade official prices to makers of cast iron pipe to the extent necessary to enable the latter to meet foreign competition for 25,000 tons of cast iron pipe now pending in Mexico City.

¶A resolution adopted by directors of the institute Sept. 20 instructed the committee of traffic managers to prepare tariff rate books. These tariffs will be presented in four parts: (1) A rail and ocean tariff, available by Nov. 1; (2) an all-rail tariff covering official territory, available in November; (3) a tariff covering all-rail rates from Birmingham, Ala., to southern destinations; (4) the fourth tariff will cover western territory beyond the limits of the preceding tariffs.

Government

PRESTIGE of the government in the field of commercial standardization is such that the work should be carried on by the bureau of standards. This was the practically unanimous opinion at a conference in Washington, Oct. 18, when representatives of industries interested in standardization conferred with Secretary of Commerce Roper and other officials of the department.

Representatives of the American Standards association, whose offer to carry on the work gratis had been tentatively accepted by Secretary Roper, when the appropriation for standardization was reduced from $300,000 to $25,000 a year, conceded that the backing of the government was highly necessary. A resolution recommending that the government continue the work was adopted.

¶A committee of business leaders to focus their experience on problems of unfair trade practices, in order to organize an effective attack on

the economic waste now handicapping business as a result of such practices, has been set up by Gerard Swope, chairman of the business advisory and planning council for the department of commerce.

Unfair business practices between buyers and sellers rather than between competitors will be studied first. Particular attention will be given to the effects of unfair trade practices upon the consuming public. Lincoln Filene, Boston, is chairman of the committee. There is no representative for steel. The second general meeting of Mr. Swope's business advisory and planning council has been scheduled for Nov. 1.

¶A questionnaire by the federal trade commission, under the authority of the senate, calls on corporations listed on the New York stock and New York curb exchanges doing an annual business of $1,000,000 or more to submit various data, chiefly for 1932. Total assets, net sales, net income, number of directors and executive officers, their compensation and any special compensation. What is really wanted is information concerning salaries.

¶Issuance of a finding of dumping with respect to ferromanganese from Canada is not justified, states a treasury report.

¶Bureau of internal revenue has announced refunds: $85,000 to Gulf States Steel Co., Birmingham, Ala., $71,919 to Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., and $37,544 to Pressed Steel Car Co., McKees Rocks, Pa.

Business

PUBLIC sale Oct. 18 of the Empire Steel Corp., Mansfield, O., in receivership over a year, resulted in the Empire division in Cleveland being purchased by William H. Davey, president of the Canton Tin Plate Corp. and former principal owner of the Empire corporation, and the remainder of the Empire corporation being bid in by the reorganization committee.

Operation of the Empire Steel Corp., minus its Cleveland division, will be continued substantially as at present. Mr. Davey states that the Empire mill in Cleveland will begin operations again about Nov. 1, employing 400.

¶General Electric Co., Schenectady, N. Y., reports third quarter orders totaling $43,733,499, compared with $35,539,858 in the second quarter of this year and $25,655,403 in the third quarter of 1932. Sales billed in the first nine months of 1933 totaled $97,426,146, against $113,049,474 a year ago.

¶Fourth quarter carloadings of all commodities, as estimated by the regional shippers' advisory boards, will aggregate 4,920,561, or 14.7 per cent over the actual loading of 4,290,050 cars in the fourth quarter of 1932. For iron and steel the estimate of 197,965 cars in this quarter is 50.4 per cent greater than the 131,642 cars a year ago. Estimates of fourth quarter car requirements for other industries, also an increase over last year, are: 53,176 for automobiles and trucks, 212,213 for ore and concentrates, 2,071,073 for coal and coke, and 16,634 for machinery and boilers.

¶President Roosevelt announced late Friday that M. Kalinin, president of the All-Union Central Executive committee, Moscow, will send M. Litvinov, peoples' commissar for foreign affairs, to represent the soviet government in an effort to clear up some misunderstandings of the past 16 years. This is the first step toward resumption of trading with Russia, and presumably may lead to formal recognition eventually.

Codes

A RECORD for briefness in hearing NRA codes was established last week when nine minutes sufficed for the code for the rolling steel door industry.

Three minutes were taken by the deputy to call the audience of four to order and to outline the procedure. Four minutes were required for the formal filing of the code by H. A. Toulmin, representing the Rolling Steel Door institute, and for a brief on behalf of labor by William P. McGinn, president, International Association of Bridge, Structural and Ornamental Iron Workers. The deputy consumed two minutes relating steps required to prepare the code for final approval by the President, and the hearing was over.

¶Monday, Oct. 30, in the United States chamber of commerce building, Washington, the code of the American Institute of Steel Construction Inc. comes up for hearing before Deputy Administrator Malcolm Pirnie. The code carries a maximum work-week of 40 hours. For establishing minimum rates of pay the code defines seven territorial districts and provides zones of 30 miles around New York, Chicago and Pittsburgh.

¶The code of the Concrete Reinforcing Steel institute went on hearing Monday, Oct. 23, in Washington.

¶A separate code authority for the scrap iron industry will be established under a basic code for the entire waste materials industry, with power to administer the code, receive complaints, make investigations, act as a clearing house for all reports required by the government, and make recommendations and amendments restricted to the scrap iron industry.

¶Consecutive hearings on the buffing and polishing composition and the buff and polishing wheel codes were conducted last week, the codes providing a 40-hour average work-week and a minimum wage of 32½ cents per hour. Labor demanded a 35-hour week and a minimum of $14 a week.

¶Code of the bolt, nut and rivet industry filed by the American Institute of Bolt and Rivet Manufacturers, setting up a 40-hour work-week and rates of 25 to 32 cents per hour for female labor and 25 to 40 cents for male, will be heard Oct. 31.

¶Code of the Special Tool, Die and Machine shop institute, providing a 48-hour week for skilled employes and a minimum of 70 cents per hour for skilled workers, will be heard Nov. 2. Other scheduled code hearings: Machine tool and equipment distributing trade, Oct. 27; all-metal insect screen industry, Oct. 26; nonferrous foundry industry, Oct. 27; grinding wheel industry, Oct. 26; antifriction bearing industry, Oct. 24: amendment to the cast iron soil pipe code, Oct. 23; cast iron boiler and radiator industry, Oct. 24.

Public Works

OCT. 16 marked the first 100 days of public works administration at Washington. Allotments to date total $1,709.000,000 out of $3,300,000,000 made available, these allotments covering more than 7000 federal and nonfederal projects.

A deadline of Jan. 1, 1934, has been announced for the submission of projects for federal assistance.

¶An allotment of $535,887 has been made by PWA to the navy department for new mechanical and handling equipment and tools, it being estimated that 2500 man-months of labor will be produced. These allotments ranged from $37,000 for the Puget sound navy yard to $1000 for the Norfolk naval air station.

Financial

HARBISON-WALKER REFRACTORIES CO., Pitsburgh, and subsidiaries, report profit of $247,700 in second quarter. Nine months' profits this year are $542,100 after all charges, against net loss of $277,100 in the same 1932 period. Company reports bank loans have been reduced from $2,050,000 on Dec. 1, 1932, to less than $400,000 as of Sept. 30, 1933.

¶Nova Scotia Steel & Coal Co., Sydney, N. S., and subsidiaries, report a combined loss of $602,613 for 1932, compared with a profit of $67,932 for 1931. After provisions for sinking fund and depreciation the net loss in 1932 was $1,102,413 against loss of $421,868 in 1931.

Steel Output Loses 6 Points to 34%, Early May Level

A PRECIPITATE drop of 6 points to 34 per cent brought steelmaking last week to the lowest level since the first week of May. This reduction cut across all operating districts except Birmingham and Detroit, which were stationary at 30 and 55 per cent, respectively, and Wheeling, which gained 2 points to 47 per cent, as the Weirton plant resumed. This week a further loss is indicated.

Chicago

Steelmaking operations dropped 4 points the past week to 45 per cent, reflecting a cessation of pressure for shipments against expired contracts. The outlook is uncertain, but a further recession is indicated. Blast furnace schedules are unchanged, 11 of 36 steelworks stacks being active.

Cleveland

Steelworks operations in the Cleveland-Lorain district for the week ended Oct. 21 averaged 33 per cent, down 13 points from the preceding week. Corrigan, McKinney Steel Co. operated three of its 14 open hearths, but at the close of the week was warming up a fourth unit. Otis Steel Co. operated two of its eight units, while at Lorain the National Tube Co. continued with eight of its 12.

Buffalo

Active open hearths here last week decreased to nine, dropping the Buffalo ingot rate 5 points to 24 per cent. This week opens on the same basis.

Eastern Pennsylvania

Steelmaking operations in the eastern central seaboard district have again declined, now holding at 23 to 24 per cent, as against 26½ per cent a week ago. With contract specifications light and new tonnage coming out slowly, a further reduction is expected.

Pittsburgh

Steel ingot production last week confirmed the anticipated decline of 5 points and averaged 35 per cent. For this week, a decline of 2 points is anticipated. The decline is expected to continue throughout the rest of this month, at least because of the slow status of new buying in steel products.

Seventeen out of 53 steelworks blast furnaces continue on. Carnegie Steel Co. is operating 9 out of 32 and Jones & Laughlin Steel Corp., 4 out of 11, in the district. Two other Corporation stacks are on and two other independent furnaces, one each for Pittsburgh Steel Co. and Pittsburgh Crucible make up the total.

Youngstown

Ingot output here last week declined 6 points to 51 per cent and was expected to start this week at 48-49 per cent. Out of 83 open hearths, 43 are melting. Carnegie Steel Co.'s bessemer output has slackened.

Wheeling

Steel ingot schedules advanced 2 points here last week to 47 per cent, 17 out of 37 open hearths being on in four district plants. Weirton Steel Co. has been gradually adding open hearths since settlement of its strike Oct. 17, but another large producer has been curtailing operations. The Wheeling district operating rate this week likely will expand to between 50 and 55 per cent.

New England

Steel ingot operating rate went off last week to 82 per cent, a drop of 13 points. For the week starting Oct. 23 a further recession is likely. One of the largest basic open hearths is down for repairs. Less pressure on finishing departments, with the completion of old contract shipments, is being reflected in slower ingot production.

Birmingham

Ingot production remains unchanged at 30 per cent for the third consecutive week. Several open-hearth furnaces are being put in shape for immediate resumption.

Canada

With the resumption of the 18-inch merchant mill, 400 to 500 men have been returned to work at the Algoma Steel Corp., Sault Ste. Marie, Ont. Two open hearths have been started and the blooming mill and the 12-inch mill also are operating.

Gear Makers Hold Code Discussion

MARKETING and economic problems of the day were matters of principal consideration at the sixteenth semiannual meeting of the American Gear Manufacturers' association held in Wilkinsburg, Pa., Oct. 17-18. Varying from customary procedure, no technical papers were presented.

Aside from papers on gear selling, trade ethics and practices, much of the Oct. 18 session was devoted to

Operating Rate of the Steel Industry, by Weeks

All figures except monthly open-hearth and bessemer totals of American Iron and Steel institute are percentages, based on reports from Pittsburgh, Chicago, Youngstown, eastern Pennsylvania, Cleveland, Birmingham, Buffalo, Wheeling, New England, St. Louis, Lorain, Detroit districts. STEEL's weekly estimates take into account only actual available capacity. Whether a week is the first or last of a month is determined by the month into which a majority of its days fall.

1932	1st Week	2nd Week	3rd Week	4th Week	5th Week	STEEL'S Average	Institute's Monthly Total tons	Institute's Monthly Average
Jan.....	22	25	26	27	28.5	25.7	1,484,991	26.41
Feb.....	28.5	27	25	25	....	26.4	1,481,253	27.40
March....	25	25.5	24.5	23	....	24.5	1,433,337	24.55
April.....	23	22	22	23	24	22.8	1,259,629	22.40
May.....	24	24	25.5	23	....	24.1	1,125,243	20.01
June.....	21	17	17	17	....	18.0	912,757	16.23
July.....	14.5	12	15.5	16.5	16.5	15.0	806,722	14.92
Aug.....	14.5	14.5	15.5	14.5	....	14.7	846,730	14.50
Sept.....	13.5	15.5	15	17	....	15.3	991,858	15.64
Oct.....	18	19	19.5	19.5	19.5	19.1	1,087,058	19.33
Nov.....	21	21	19	17.5	....	19.6	1,032,221	18.36
Dec.....	16	15	14	12	13	14.0	861,034	15.31
1933								
Jan.....	15.5	17	18	19	....	17.4	1,030,075	18.23
Feb.....	19	19	19	17	....	18.5	1,086,867	20.83
March....	15	13.5	15	14	15.5	14.6	909,886	15.50
April.....	17.5	20.5	25	29	....	23.0	1,362,856	25.08
May.....	33	36	40	43	....	38.0	2,001,991	34.11
June.....	47	48	49	51	54	49.8	2,597,517	45.96
July.....	55	57	57	55	....	55.8	3,203,810	58.95
August....	54	54	51	48	45	50.6	2,900,611	49.42
Sept.....	42	41	40	38	....	40.9	2,310,982	40.89
Oct.....	38	40	34	..	....	....	.....	.....

discussion of suggestions received from members of the association, which suggestions were designed to supplement their NRA code. Hearing on the gear makers' code has not yet been held in Washington.

A comprehensive analysis of gear merchandising was presented in a paper by Francis A. Emmons, general sales manager of Foote Bros. Gear & Machine Co., Chicago, in outlining the methods of approach to this problem gear makers should use through not only market analysis, but advertising, sales promotion, and service. Market analysis was especially stressed, with detailed figures presented to show how gear makers can predetermine their best sales outlets with some degree of certainty.

Interprets Fair Practices

Howard Dingle, president, Cleveland Worm & Gear Co., Cleveland, outlined an interpretation of business ethics and fair practices and elaborated on an interpretation of six specific unfair trade practices being incorporated in the gear producers' code. Roscoe Seybold, comptroller, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., addressed the group on "NRA and Cost Accounting" and urged the adoption of uniform accounting practice as the only basis for compilation of accurate selling costs.

Some 55 individual members of the association attended the two-day session and at the Oct. 18 morning meeting approved the adoption of a supplemental NRA code in four clauses. These embrace the prescribed procedure in filing price lists and discounts, the provision that prices quoted on specified quantities of gears shall not be applicable to lesser quantities, and a provision guarding against commitments being granted on declines or advances in gear prices beyond 90 days.

Ten new association members were announced as follows: Chicago Gear Works, Chicago; Braun Gear Corp., Brooklyn, N. Y.; Cleveland Worm & Gear Co., Cleveland; DeLaval Steam Turbine Co., Trenton, N. J.; Earl Gear & Machine Co., Philadelphia; Ganschow Gear Co., Chicago; Globe Engineering Co.; Illinois Gear & Machine Co., Chicago; Union Gear & Machine Co., Boston; and Western Gear Works, Seattle. An amendment was voted to the constitution permitting the joining of affiliate members. Quaker City Gear Works, Philadelphia; and Michigan Gear & Engineering Co., Detroit, took this form of membership.

Members of the association attended the plant inspection trip on Oct. 18 to the Allegheny Steel Co., Brackenridge, Pa., and the American Sheet & Tin Plate Co., Vandergrift, Pa., in company with members of the Association of Iron and Steel Electrical Engineers, meeting in Pittsburgh.

Code Considerations Absorb Attention of Fabricators

DRAWN by interest in problems of operating under NRA conditions and in engineering and other activities of the organization, more than 250 members and guests attended the eleventh annual meeting of the American Institute of Steel Construction Inc., held last Thursday, Friday and Saturday at the Stevens hotel, Chicago.

While the program, as in previous years, covered the many phases of activity in which the organization is interested, the major emphasis was placed upon problems embraced in the preparation, filing, hearing and administration of the code of fair competition for the steel construction industry. The Friday morning and afternoon sessions were devoted exclusively to the discussion of code problems.

The institute's work on a suitable code dates from early in May when Clyde G. Conley, its president, appointed a committee to draft a code. The committee consists of C. Edwin Michael, Virginia Bridge & Iron Co.; G. H. Blakeley, McClintic-Marshall Corp.; W. M. Wood, Mississippi Valley Structural Steel Co.; R. P. Hutchinson, Bethlehem Fabricators Inc.; L. A. Paddock, American Bridge Co.; and Mr. Conley, ex-officio.

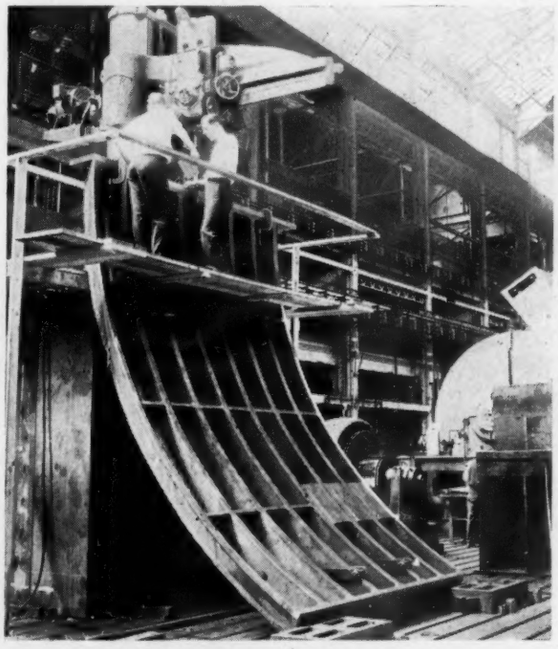
The code prepared by this committee was approved by the board of directors of the American Institute of Steel Construction Inc. on Aug. 14. Two days later, at a special meeting in Pittsburgh, fabricators and erectors of structural steel and iron considered and approved the code as recommended by the board. On Sept. 7 the code was filed with the administrator of NRA. A public hearing has been scheduled for Oct. 30, under Deputy Administrator Malcolm Pirnie.

Most Plants Following Terms

Discussion of the code at the convention was for the purpose of explaining and clarifying its provisions. To date about 80 per cent of the industry by volume has assented to the code as now drafted.

Pending approval of the code most of the steel construction shops already have put in effect the increases in wage rates and the reduction in hours contemplated in the pact. This brings the rates and hours of the construction industry into conformity with practices existing under the new code of the steel producing industry.

The code contemplates representation and participation by all members of the industry in proportion to their previously established production and that those engaged in the business



MACHINING ON A LARGE SCALE: Illustration shows finishing operations on an 18-ton segment for gates at Boulder dam. Six such segments comprise one gate, and there are a total of eight gates in the dam. Special equipment for drilling and other work necessary for the close fitting of these gates is in use at the East Pittsburgh, Pa., shops of Westinghouse Electric & Mfg. Co.

may, upon application, have similar proportionate representation and participation. During the period of emergency, however, it is provided that no additions will be made to existing fabricating capacity, except as may occur in increasing operating efficiency.

In presenting the annual address of the president, Clyde G. Conley, Mt. Vernon Bridge Co., Mt. Vernon, O., characterized the past year as one of stress and strain in the affairs of the institute. He declared that the experience of the 12-month period shows that the steel construction industry was fortunate in having a strong organization such as the institute upon which it could lean. "Without the institute," he said, "I very much fear that our industry would have been in chaos and that we would have had many more failures than we have had."

Mr. Conley referred to the institute's encouraging gain in membership, stating that in 1932 its members shipped over 87 per cent of the total shipments for the country. He alluded to the report of the treasurer, which showed that the organization had lived within its sharply reduced income.

Eulogizes Miller's Work

The president emphasized the great loss suffered by the institute through the death of Lee H. Miller, late chief engineer, who was one of the leaders in founding the institute and who directed its engineering activities and contributed much to the effective promotion of markets for steel.

Mr. Conley described the work of the institute in preparing a code of fair competition for the steel construction industry. He declared that this is the institute's most important task of the year.

The annual report of Executive Director Charles F. Abbott which in his absence was presented by V. G. Iden, director of public relations, showed that in spite of the difficulties which beset the industry, the institute has made progress. Members as of Sept. 30, 1933, numbered 178 as compared with 166 a year previous.

Shipments Continue Decline

This showing is gratifying because between 1931 and 1933 about 200 companies retired from business. There remain 462 units in the industry. Shipments of fabricated structural steel have shrunk from a peak of 3,196,249 tons in 1929 to 1,005,020 tons in 1932 and to 374,772 in the first half of 1933. During the first seven months of 1933 shipments were slightly below those for the comparable period of 1932.

Current assets of reporting structural steel companies average 23.70 for 1932, a decline from 45.45 in 1931 and 54.34 in 1930. Return on sales for 1932 averaged a loss of 9.5, compared with a loss of 5.0 in 1931 and a profit of 1.0 in 1930.

Mr. Abbott's report also touched upon the activity of the institute in working with the government on the public works program, its sponsorship of a fireproof homes institute and its work in behalf of steel houses, its campaign for encouraging beauty in bridge design, and its numerous technical, engineering, publicity and other activities.

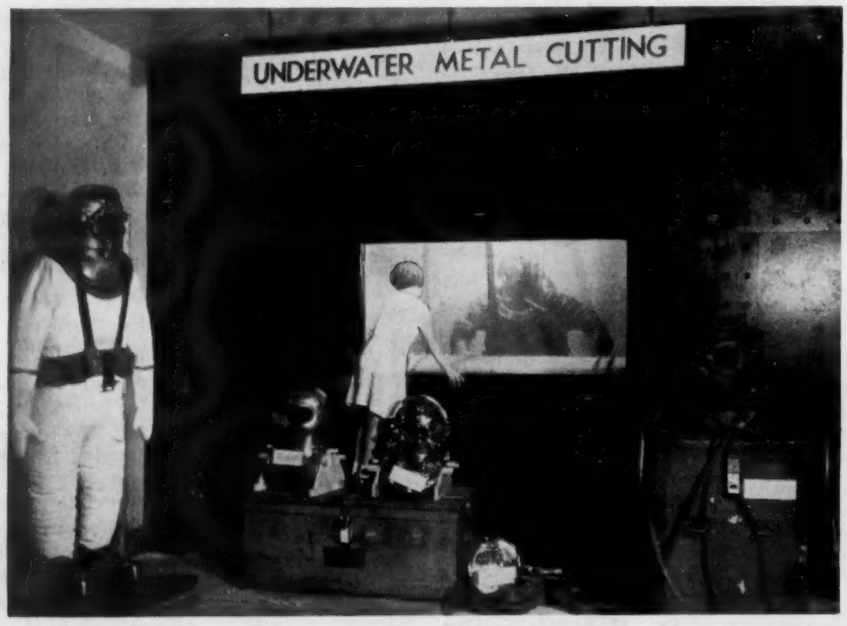
F. H. Frankland, director of engineering service, reported in greater detail on technical activities. He explained the function of the recently appointed technical advisory board, reported progress in a number of phases of engineering research in which the institute is co-operating, outlined the present policy and status of the work of the institute's district engineers, touched on the significance of the institute's manual, which recently has been revised to take into account the new standardized series of wide flanged sections, and called attention to the encouraging results of the institute's campaign for improvement of the aesthetics of the design of steel bridges.

Steel Chief Speaks

The principal speakers scheduled for the anual banquet Friday evening were Myron C. Taylor, chairman of the board, United States Steel Corp., and Col. H. M. Waite, deputy administrator, federal emergency administration for public works. The report of this event will appear in next week's issue. An account of the engineering phases of the convention program appears on pages 29 and 30 of this issue.

The paper by Dr. D. B. Steinman on the Sky Ride at the Century of Progress exposition, abstracted on page 29, was discussed by E. T. Blix, chief engineer, Mississippi Valley Structural Steel Co., St. Louis, who outlined some of the unusual problems in fabricating this unusual structure.

Mentioned also on page 29 is a paper by W. F. Barnes on small plant production. The speaker dealt with the analysis of facilities of the shop and experience of shop personnel in order to determine the type of work to be solicited to help fill up the plant during the depression. He cited cases where small fabricators had successfully taken on small barge work, simple machine construction and special engineering construction. One fabricator engaged in local car repair work, another took manufacture of a simple item of heavy hardware.



DEMONSTRATES CUTTING OF STEEL UNDER WATER: A large tank has been constructed in main hall of the Museum of Science and Industry, Chicago, and in it a diver cuts a steel bar with an oxyelectric torch. By means of a microphone in his helmet, the diver explains the process while submerged. In a welded stainless steel booth, comprising another part of the exhibit, an operator demonstrates and explains arc welding. Visitors peer through windows of special glass to prevent eye injury. The welding equipment and accessories used in the demonstrations have been loaned by the Lincoln Electric Co., Cleveland

Talks on Stainless Steel

An address entitled "Technical and Economic Status of Stainless Steel," will be presented by Dr. W. M. Mitchell, stainless steel consultant, United States Steel Corp., before members of the New York chapter of the American Society for Steel Treating, Oct. 23, at the Woolworth building, 233 Broadway.

WINDOWS OF WASHINGTON

WASHINGTON

STARTING with the President, who is bristling toward Blue Eagle chiselers and threatening them with fines of $500 and six months in prison, Washington is getting hard boiled with business.

Senator Wagner's national labor board has become almost officious in intervening in labor difficulties and, as steel has learned in the Weirton case, the ensuing publicity redounds to labor rather than to capital.

The federal trade commission is probing salaries of executives of corporations listed on the New York stock or curb exchanges and doing an annual business of $1,000,000 or more. Coming on the heels of an edict against excessive salaries to movie stars and RFC pressure on railroads, salary fixing appears in prospect.

NRA administrators and assistants dealing with the construction industry code are credited with the viewpoint that reductions in labor and material costs—including steel—would stimulate the much-needed revival of building. This would almost parallel Railroad Co-ordinator Eastman's program for shaving the price of rails.

Deposit insurance is going into effect Jan. 1, strong opposition of banks to the contrary notwithstanding. It has also developed in the past few days that the administration will stand pat on the securities act, a modification of which is sought as an aid to refunding operations.

And up on Capitol Hill, the Pecora investigation of the banking and securities business is turning up questionable practices admittedly belonging to a past era but calculated to incite distrust and perhaps pave the way for restrictive legislation.

MEANWHILE, Washington is more hopeful of the business situation, believing that while the country is in the second sawtooth of recovery and the fourth quarter will not be satisfactory, the trend for the long pull is right.

Govt. Getting "Hard Boiled"

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More Hopeful for Business

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Iron, Steel Spreading Work

An economist and statistician whose pronouncements are highly regarded both within and without the government sums up three typical reasons for a hopeful attitude:

(1) There is every indication that the low point has been passed, both here and abroad. Despite the present reaction, the low of this dip is not likely to plumb previous lows. The bottom of the depression, considering all factors, was reached about June, 1932; the secondary low in March, 1933; the tertiary low is now in the making.

(2) It is quite clear that the banking situation will not be permitted to get bad again, and practically all banks now open will remain open.

(3) For the immediate present, at least, the government will engage in no more unsound economic experiments.

A good many in Washington believe that business will not react much farther than at present, and that if the present recession can be limited a genuinely strong upturn will start about next March.

It may be worth noting that the President's plans are not negative in nature, designed to alleviate the depression, but have become of a positive character, aimed at actually creating business.

DESPITE the President's apparent strong espousal of NRA, the prevailing opinion in Washington is increasingly hostile toward it, and there is more frank admission that the mistake was in playing it up for speedy recovery rather than for a long pull rationalization of business.

The situation is rapidly veering toward the point where codes will be just as effective as the industries they govern desire them to be.

Any industry in a mood to eliminate vicious and uneconomic practices and holding a majority of producers in line can accomplish much. The recovery act will be the law of the land at least until June 16, 1935, and until then industry can co-operate freely and fully without fear of the antitrust laws. The potentialities of codes are admittedly great, if industries enforce them.

On the other hand, while compliance boards are being set up, it is not believed that Washington will police any dissenting industry very vigorously so long as the industry in general adheres to the specified work week and minimum wages. Anyway, policing is a word that Washington is refraining from these days.

The Blue Eagle division appears listless. The NRA staff has been reduced and substitutions are no longer being granted. Around the NRA itself the atmosphere is much like that of the closing day of a convention, when the delegates are restless and eager to return home, and even the cigar smoke is stale.

General Johnson was successful last week in a bout with a newspaper man. The general's position was entirely clear and the freedom of the press was not involved, but in a happier and busier day the observations which aroused the general's ire would have passed unnoticed.

An almost forgotten NRA governing board—the cabinet group of which Secretary Roper is chairman—has been revived and appears the instigator of a reclassification of duties and salaries of NRA officials and employes. After adjustments have been made, to make NRA positions comparable with similar posts in other departments, a 15 per cent pay cut will be enforced. There will be a small scandal if salaries of some

higher officials of NRA are excepted.

Deputy administrators are discouraging the inclusion of penalties in codes, suggesting that the $500 and six months imprisonment clause of NIRA is adequate to cover any situation.

The past week mail carriers have delivered to every employer a questionnaire seeking to determine the number employed on June 17, the day after NIRA was signed, and on Oct. 14; also the payrolls on these two dates.

These questionnaires are to be returned to the President, but the actual practice is that the postoffice department in Washington is intercepting them and diverting them to NRA. The President, incidentally, is already receiving an average of almost 4000 letters a day, about six times the mail of President Hoover. The questionnaires are being received at the rate of 50,000 daily.

This is the survey General Johnson said some weeks ago he would probably make through public utilities.

LABOR, however, is not ready to relinquish the weapon which it wrested from a willing congress—section 7a.

Labor advisors are no less insistent for more favorable treatment of wages and hours in all codes, and are predicting that all restrictions in codes now effective will be tightened when these codes come up for revision.

The suspicion also is growing that some industries which have stood out against labor are being hazed in a genteel way, their code negotiations being dragged out interminably because of small technicalities.

Labor is freely forecasting that the next congress will enact the 30-hour week measure proposed at the last session and only sidetracked because of NIRA.

The feeling of organized labor against General Johnson is increasingly hostile, it being felt that he dealt harshly with the recent American Federation of Labor convention in denouncing strikes. The general is in the unhappy position of satisfying neither side.

Secretary Perkins also is not regarded wholeheartedly as an advocate of labor despite her swing to the left. To the average walking delegate the secretary is an "uplifter."

Though opposition to the organization of employes of hitherto open shop plants on the basis of federal rather than craft unions was voiced at the recent convention, no change is contemplated in the program.

At the Scranton convention in 1901 a stand was taken which still rules. In iron, steel, automobile, rubber and other unorganized industries, workmen will continue to be enrolled in so-called industrial unions, in which the United Mine Workers is the best example, and in time these will be broken down into crafts if this seems desirable.

A spokesman for the federation contends that an industrial union is more satisfactory for employers than a number of craft unions in a given plant in that only one agreement need be entered into and only one committee dealt with.

Labor is out for the scalp of some NRA officials now rewriting the construction code, expected out by Nov. 1. One proposal was for an unchanged building trades labor wage until Sept. 1, 1934. Dr. Leo Wolman, chairman of the labor advisory board, has been compelled to issue an official denial that he was suggesting a decrease of 10 per cent in wages.

Assistant PWA Administrator Waite has been under fire from employers because the PWA setup has virtually caused two levels of construction costs in some cities, PWA fostering the 30-hour week and higher scales. The explanation of PWA is that the 30 per cent of the loan which need not be repaid is for the purpose of meeting additional costs.

STEELWORKS in September made a showing from the standpoint of spreading labor which indicates, government officials concede, that the spirit of the steel code has been lived up to.

In September, it will be recalled, the percentage of ingot capacity operated was 40 per cent, compared with 49 per cent in August. Department of labor figures show that on the basis of 1926 equaling 100, the decline in payrolls from August to September was from 49.7 to 47.1, which was consistent with production.

But from August to September the index of employment, also on the basis of 1926 equaling 100, rose from 71.1 to 74.8. This appears to be proof that the industry took on more workers—the prime objective of NRA.

American Federation of Labor estimates of present unemployment are 11,000,000 persons, compared with the peak of 13,689,000 last March.

Some curious deductions are made by Secretary of Labor Perkins from September statistics. Cheaper goods and small shops showed the greatest gain in business, evidencing buying by the so-called laboring class. The South, where labor has been raised more than in the North, is buying furniture and household goods liberally.

Laundries and dry cleaning establishments suffered less than other service industries during the depression and are coming back faster, a token that the higher American standard has not been depreciated.

The President was pleased but not wholly satisfied last week with the report of government economists that factory employment in September had recovered 40 per cent of the decline from 1929, while payrolls had recovered 25 per cent.

Steel Heads Inspect Steel Work for Boulder Dam

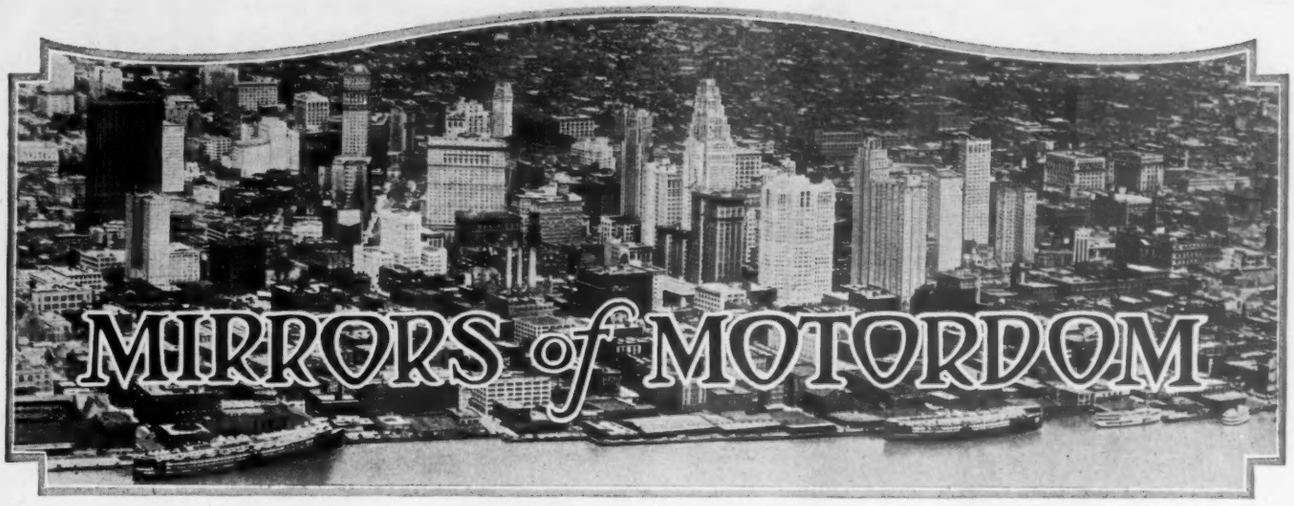
Well-known steel executives were entertained at the East Pittsburgh, Pa., shops of Westinghouse Electric & Mfg. Co. Oct. 13 by examples of metallurgical tests and developments the Westinghouse company is carrying on there. The eight large inlet gates the company is building for the Boulder dam, said to be the largest pieces of machinery ever made of rolled steel, were inspected.

F. B. Hufnagle, president, Crucible Steel Co. of America; C. W. Bennett, president, and D. A. Barrett, vice president, American Sheet & Tin Plate Co.; and J. J. Kennedy, vice president, National Tube Co., were among those attending. Others included J. W. Marrinan, vice president, A. M. Byers Co.; C. H. Hunt, Weirton Steel Co.; R. E. Zimmerman, vice president, United States Steel Corp.; G. G. Thorpe, president, Illinois Steel Co.; G. C. Kimball, vice president, Illinois Steel Co.; Gordon Fisher, chairman of the board, Spang-Chalfant & Co. Inc.; W. E. Watson, vice president, Youngstown Sheet & Tube Co.; Frank P. Bell, president, Edgewater Steel Co.; and E. L. Benedict, vice president, Pittsburgh Steel Co.

German Tin Plate Exports Almost Double Year Ago

The steady upward trend in German tin plate exports which began in 1929 received a further marked impetus this year, according to advices from Consul Sydney B. Redecker, Frankfort-on-Main, made public by the commerce department. Exports, he points out, which amounted to only 30,000 tons in the 1929 period had risen to nearly 82,000 tons in 1932.

During the first half of 1933, German tin plate shipments totaled 60,854 tons, compared with 37,000 tons in the corresponding period of last year. The expansion this year, according to the report, has been due to gains in the trade with a wide number of countries, including Japan, the premier market, exports to which rose to 17,722 tons in the first half of this year from 14,347 tons in 1932.



Labor Threat Still Grave

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October Cars Under 150,000

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Rumors of Superchargers

DETROIT

RARELY has the automobile industry so closely approached the start of production on new models with so many uncertainties hanging over it. Material prices, labor, the possibilities for retail sales are unusually obscure.

Normally by late October most manufacturers have painstakingly ascertained the production cost of every item—of which there are several thousand per car—and forecast the trend of costs during the model year.

Ford develops a car, then sets a price calculated to attract volume. Other manufacturers build to a price. So close is this figuring that $1 per car over the estimate causes every part and all production technique to be reviewed.

This year the price situation is baffling, and one large corporation is only now assembling its costs and beginning to price its 1934 lines. The difficulties of gaging today what will be an average cost over the entire model year, in order to avoid repricing during the year, are enormous.

Stocks of pig iron and finished steel accumulated prior to the recent advances will carry into the first quarter of 1934, but will these advances stick and should allowance be made for them after present stocks are exhausted?

Nonferrous metals and leather, to cite only two items, have surrendered part of their price increases; will they rebound? Textiles, rubber, lumber, finishes—where will they be priced six months hence?

Textiles, incidentally, are in such short supply that some proposed changes for 1934 interiors cannot be effected and some orders have been transferred from the South to the higher-price northern mills.

The consensus of opinion in Detroit is that, for the long pull, commodity prices are headed up. In addition, labor costs in the automobile industry itself have been raised by the NRA code. Estimates of the incidence of the automobile and raw material codes on car costs range from $25 up.

On the other hand, the offhand opinion is that the economic situation of the United States will be improved in 1934 and hence automobile demand will expand. Only a moderate increase in sales would neutralize these higher material costs through decreased overhead per unit.

Detroit, however, is a little less certain today than it was three months ago that 1934 will be a genuinely good automobile year. As related last week, striking gains in retail sales recently have been accomplished by maturing sales, through fear of a price advance, that would normally have been postponed until next year.

It is, however, a safe guess that any price advances in the lower price brackets, where the competition is stiff, will not be so great as might have been expected.

Labor will show its hand over the next 60 days. While many tool and die makers remain on strike, so much business has been shifted to shops in other cities that any inconvenience in getting out new models has been greatly lessened. The chief worry is whether labor in production departments will attempt to tie up Detroit just when new models should be put on the assembly line. There is no small concern on this score.

THIS apprehension over labor colors the production situation for the remainder of the year.

At the moment, individual schedules are not indicative because departments which are ahead of the assembly line are either down for inventory or, in a few cases, have already started up on 1934 parts.

The last official report on production was for August—236,480 units in the United States. September output probably was slightly below 200,000 units, estimates ranging from 180,000 up. October is falling below 150,000, perhaps as low as 125,000 units.

Even so, October will practically treble last October, when only 48,702 cars and trucks—the smallest for any month in the depression—were assembled. In all 1932 only 1,370,678 units were made; this year to Oct. 1 the total was about 1,660,000, and a 2,000,000-car year seems assured unless labor troubles interfere.

Considering all its lines, Chrysler in October is more closely approximating its September schedule than any other manufacturer. Every indication still points to the Chrysler redesign of bodies being radical, probably more radical than any other group.

At this time Chrysler has no eight priced lower than $900, and it is possible that this omission will be rectified in 1934. Sales of the Dodge six have been especially strong since Aug. 1, and claims of rivals that they are outselling competitors in this price field probably will be challenged.

Chrysler has been a heavy buyer of equipment recently, one order necessitated by changes in crankshafts totaling $185,000. There is also some wonderment whether Chrysler has revived its experimental work on a front-wheel drive car, which was dropped when the depression broke.

Late last week, however, Chrysler canceled one large order for equipment required for important mechanical changes. For all manufacturers, the possibility of deferring some proposed changes is an in-

creasing one as the labor problem becomes more serious.

Oldsmobile plans to continue its eight in approximately the present price class, but a six much lower priced than the present one and somewhat competitive with Chevrolet, Plymouth and Ford is a probability. The showing of the Oldsmobile eight in its price class has no superior in General Motors' comparisons with competitors. The present type of Oldsmobile wheel has been found entirely satisfactory and is being continued on the 1934 line.

There is no confirmation of the report that Ford will depress Lincoln in size and price to what might be considered the upper ranges of Buick and Nash. Lincoln has accounted for 40 per cent of the business in its class, and apparently will be continued in 1934.

As is the case with a model priced lower than the present V8, Ford undoubtedly has explored the medium price field and some experimental work has been done, but nothing definite is now in sight. It should be understood, however, that all Ford plans are subject to a one-man over-night revision.

Graham will widen its doors and change its fender lines somewhat in 1934, but the chief mechanical innovation may be the installation of a supercharger for the engine. Franklin is now the only stock car featuring a supercharger.

Auburn and Cord also have done considerable experimenting with a supercharger. A new Cord 12-cylinder engine develops 250 horsepower. A front-drive car smaller than Cord has been designed, but its introduction in 1934 depends, among other things, on the retail outlook. The trend recently has been to mingle Auburn and Cord operations.

White Motor will shortly announce a truck in the $1000 class, the lowest price unit it has ever offered. Because there is a limited field for its 12-cylinder engine of the opposed type, popularly called the "pancake," a smaller edition is on the way.

Elimination of front axles on many cars in 1934 through independent springing of wheels, and possible application of new mountings to rear wheels, probably will compel the complete redesign of service station lifts which now take hold of the front axle and the differential housing. . . . Packard has launched an elaborate direct-mail advertising campaign with the objective of demonstrating the new series to every Packard owner. . . . The Japanese are offering in India for $140 a car propelled by springs that are guaranteed to give 40 miles on one winding. . . . The extent of replacement business is evidenced by the fact automobile assemblies in 1932 were only 26 per cent of 1929, but parts and equipment business was 53 per cent of 1929.

Died:

GEORGE E. RANDLES, 57, president, Foote-Burt Co., Cleveland, in Cleveland Heights, O., Oct. 14. He was an authority on machine tools. Born in Argyle, N. Y., in 1893 he became a machinist apprentice with the Pratt & Whitney Co., Hartford, Conn. Subsequently he was machinist, toolmaker and European representative for this company. He joined the Foote-Burt company in 1906 as vice president and general manager, obtaining control of the company in 1919, when he was elected president. He developed a line of special machines which helped to make possible mass production of automobiles. As director of the maintenance division, motor transport corps of the army during the World war, he was responsible for building at Baltimore a large plant for maintenance of war trucks and cars. He was active in association work, served as director and treasurer of the National Machine Tool Builders association; a member of the American Society of Mechanical Engineers, and Society of Automobile Engineers. He aided in organizing Associated Industries of Cleveland, served as president two years and continuously as a member of its board of governors. Chairman of the committee on industrial relations, National Metal Trades association, he was on the executive committee of the Cleveland branch six years, and president of the Cleveland branch three years.

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David Everett Damon, 60, president, Damon Type Founders Co., New York, in Cranford, N. J., Oct. 2.

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Aaron H. Gorson, 81, a painter famed for his scenes of the steel industry, in New York recently.

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John R. Robinson, 53, representative of the Harbison-Walker Refractories Co., Pittsburgh, in Westbury, L. I., recently.

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John G. Bannister, 73, formerly vice president of the Walworth Co., Boston, and recently retired, in his home in Phoenix, Ariz., Oct. 14.

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Ralph W. Cadman, 56, president, A. D. Cadman Mfg. Co., Pittsburgh, babbitt, brass and bronze castings, in Pittsburgh, Oct. 14. He had been president of the company since the death of his father. Mr. Cadman was active in Pittsburgh Masonic circles.

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Howard M. Bate, 62, a member of the foundry firm of William T. Bate & Son, Conshohocken, Pa., until its dissolution in 1925, in that city, Oct. 14. A member of a pioneer Conshohocken family, he received his education at Spring Garden institute and Ursinus college.

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John W. Searles, 63, president, Pennsylvania Coal & Coke Corp., in East Orange, N. J., Oct. 15. Mr. Searles was a leader in the coal industry and represented the Central Pennsylvania Coal Producers association at recent code hearings in Washington.

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Thomas W. Stone, 55, vice president and general manager, Western Gas Construction Co., Ft. Wayne, Ind., recently in that city. He was graduated from Ohio State university in 1902, going to Ft. Wayne at that time. Mr. Stone spent nearly all his industrial career with the Western Gas Construction Co.

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William T. McConway Jr., chairman of the board, McConway-Torley Corp., Pittsburgh, iron and steel foundry, in that city, Oct. 16. He was a son of W. T. McConway, who was one of the founders of the company. Aside from active participation in Masonic circles, he was also a member of the Duquesne and University clubs of Pittsburgh.

Takes Bids on Five Cranes For Boulder Dam Plant

Bureau of reclamation, Denver, closes bids Nov. 17 on furnishing and delivering f.o.b. cars at the factory shipping point four 300-ton double trolley, motor-operated, overhead traveling cranes, with span of 64 feet and with one set of lifting beams; and one 50-ton, single trolley, motor-operated, overhead traveling crane, with a span of 58 feet 2 inches, for installation in the Boulder dam power plant, Boulder City, Nev. All apparatus will be installed by the government.

Institute Becomes Gray Iron Founders' Society

In response to conditions developed in the preparation of a code for the gray iron foundry industry, a complete change in by-laws of the Gray Iron institute, Cleveland, has been effected and the name of that organization embracing its new form of organization and activities, has been changed to the Gray Iron Founders' Society Inc., according to A. E. Hageboeck, Frank Foundries Corp., Moline, Ill., president of the society.

Press Forgings Pending

Forgings are required by R. Hoe & Co., New York, for an order for $500,000 worth of presses just ordered by the *New York Sun*.

Industrial Men in the Day's News

Philip M. Morgan, President, Wire Machinery Builders' Association

A NATIVE of Worcester, Mass., he has been associated with the steel industry since returning from World war.

TREASURER and assistant to the president, Morgan Construction Co., he is identified with mill equipment manufacture.

HE takes an active part in the business, civic and social life of central Massachusetts; directs community chest.

PHILIP M. MORGAN, president of the recently-organized Wire Machinery Builders' association, is a native of Worcester, Mass., and treasurer and assistant to the president, Morgan Construction Co., that city.

Since his graduation from Harvard, following service in the Yankee (26th) division in the World war, Mr. Morgan has been associated with the steel industry, most of the time with the Worcester company, builder of steel mill equipment, wire drawing machinery and other metal fabricating tools.

Mr. Morgan was born in 1896, attended Worcester academy 1909-1914; Harvard 1914-1917, when he enlisted for war service, later returning for the years 1919-20, and receiving his A.B. degree as of the class of 1918.

Enlisting in July, 1917, Mr. Morgan served as communications corporal. He was wounded in July, 1918, and as a convalescent served with the railway transportation corps in charge of transportation at the United States hospital center, Meves, France. He was discharged in April, 1919.

Starting with the Morgan company in February, 1920, Mr. Morgan became assistant purchasing agent, assistant treasurer and then advanced to his present position, treasurer and assistant to the president. For a brief period in 1920 he was with the Youngstown Sheet & Tube Co.'s metallurgical department, and for a short time in 1921 he was associated with the sales staff of the Marble-Nye Co., Boston, distributor of heavy chemicals.

Mr. Morgan is active in the civic and social life of central Massachusetts. He is president of the board of trustees of the Bancroft private school, Worcester; vice president of the Worcester Y.M.C.A.; vice president, Machinery Builders' society, New York; director, community chest, Worcester; director, Mechanics National bank, Worcester; director, Worcester chamber of commerce, and a trustee of the People's Savings bank, Worcester.

WILLIAM J. WOOLDRIDGE has become associated with the Allegheny Steel Co., Brackenridge, Pa., as manager of electrical sheet sales. He was for several years with the Wheeling Steel Corp., and for the past ten years was manager of the electric sheet division, Mansfield Sheet & Tin Plate Co., and its successor, Empire Steel Corp.

□ □ □

Lloyd Jones has resigned as manager of the Salem, O., works of the E. W. Bliss Co., Brooklyn, N. Y., machine builder.

L. W. Nash, who has been with the company for a number of years as chief designing engineer in the rolling mill department at the Salem works, has succeeded Mr. Jones.

□ □ □

E. C. Crittenden, chief of the division of electricity of the United States bureau of standards, has been appointed assistant director of the bureau, in charge of research and testing. Mr. Crittenden's appointment fills the vacancy created by the appointment of Dr. L. J. Briggs to the directorship of the bureau last June. Mr. Crittenden was graduated from Cornell university in 1905. He entered the service of the bureau as assistant physicist in the photometry section July 1, 1909. Following the death of Dr. E. B. Rosa in May, 1921, he was appointed chief of the division of electricity. He will continue to serve as chief of that division in addition to his duties as assistant director.

□ □ □

Charles A. Colgate has been appointed Pittsburgh representative for the Roller Bearing Corp. of America, Trenton, N. J. He previously was associated with Jones & Laughlin Steel Corp., and with the Mesta Machine Co.

□ □ □

G. M. Herman, western sales representative of the United Engineering & Foundry Co., Pittsburgh, has re-

(*Please turn to Page* 68)

EDITORIAL

Labor Situation Obscured by Twisting of Real Facts

ONE of the factors in the present experiment of governmental co-operation with industry which has caused needless trouble is the misrepresentation which seems to attend every controversy between employers and organized labor. From the very beginning of NIRA, only a small portion of the American public has had access to the real facts in regard to labor relations in industry.

This has been particularly true of the labor situation in the steel industry. Not more than a dozen important newspapers have presented the news in a way which enables the average reader to understand clearly the real issues involved. In the majority of papers, almost every incident in the long chain of clashes over labor relations has been "played up" as a victory for the outside organized workers.

The most recent case of misrepresentation was in connection with the terms of the agreement made with President Roosevelt by representatives of captive coal mine companies. After reading ordinary press accounts of these negotiations, millions of readers gained the idea that the mine owners had recognized the mine workers' union and had agreed to unqualified approval of the check-off system. This is not altogether the fault of newspapers. Only a small part of the reading public reads news reports accurately. However, in many cases where the text of the dispatches was accurate, the heads served to distort its significance.

Record Is Clear on Captive Mine Settlement; Owners Met Difficulty in Fair Spirit

Fortunately for the historical record, the letter, sent by the captive mine owners to President Roosevelt states the employers' case so clearly that there is no chance for misinterpretation. It follows:

New York, Oct. 10, 1933.

DEAR MR. PRESIDENT:

The undersigned companies, operating directly or through affiliated companies, so-called captive coal mines, have been advised of your letter of Oct. 9, 1933.

Each renews the assurance which has been previously given to you and which was restated by the committee invited to confer with you on Saturday that we are desirous of co-operating to the fullest extent in your recovery program.

We understand at the conference on Saturday that the only point of difference in which it was felt that we could go further in our co-operation related to the collection of dues from those of our employes who were members of a union.

As we attempted to make plain to you in our letter of Oct. 6, 1933, our objection to the so-called "check-off" system is that we believe in the light of past experience, that the inevitable consequence of the adoption of such a system will be the closed union shop, unless it can be adequately safeguarded.

Under the national recovery act, we are required to employ our workers without regard to their membership or non-membership in any labor organization and we feel that we owe a duty to protect our employes who do not desire to be coerced into joining a union.

However, we will recognize voluntary orders for payment of any portion of the wages of any employes of our coal mines for dues to any organization of which he may be a member, to the extent that we are legally permitted so to do under the laws of the respective states in which our operations are conducted, on the understanding that all of our employes shall be free to join or not to join any union, as they please, and that any of our employes who do not wish to join a union will in some effective way be assured of adequate protection from interference, restraint or coercion of any kind. It is not our intention to surrender any right which we may have to afford them such protection.

(SIGNED BY CAPTIVE MINE OWNERS)

General Impression Differs Widely From Actual Agreement on Check-Off Demand

The foregoing letter shows clearly an attitude on the part of owners which is decidedly different from that credited to them by the general public. It states that the judgment of the employers is that the inevitable consequence of the adoption of the check-off system "will be the closed union shop, unless it can be adequately safeguarded." It recounts the provision of Section 7a of NIRA requiring employers to employ workers "without regard to their membership or nonmembership in any labor organization" and then declares the duty of employers "to protect our employes who do not desire to be coerced into joining a union." Finally, and inferentially against their better judgment and largely as a favor to the President of the United States, the owners state that under certain conditions they will "recognize voluntary orders for payment of any portion of the wages of any employe . . . for dues to any organization of which he may be a member." The statement concludes with a firm resolve to protect workers against improper interference or coercion by outside interests.

The statement should be read carefully by every employer in industry. It reveals a commendable attempt to co-operate with government authority and a firm intention to retain rights which safeguard employment and the public interest.

THE BUSINESS TREND

Favorable Signs, Offsetting Gloom, Buoy Sentiment

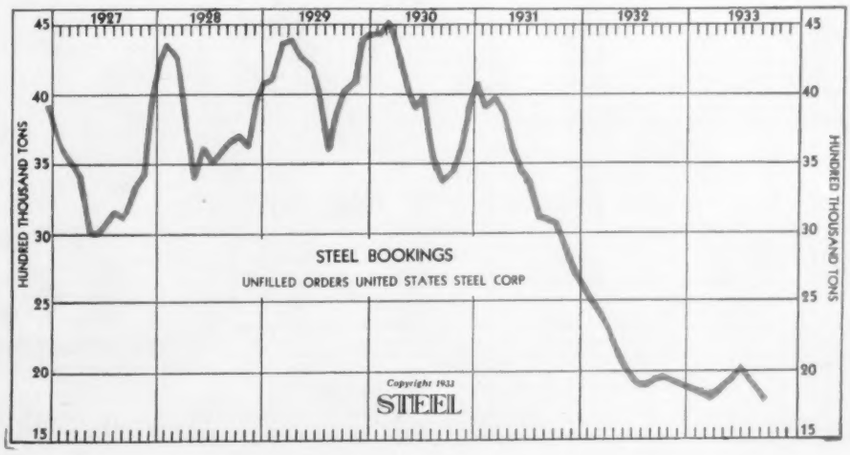
WHILE the weekly and daily barometers of business still fail to indicate a definite trend, sentiment has improved slightly during the past fortnight. The more buoyant tone is significant because it has developed in the face of several discouraging events and in spite of gloom which is prevalent in certain quarters.

Germany's action relative to the league of nations and the disarmament pact, newspaper emphasis on the Johnson-True incident as a warning sign of government encroachment on the right of criticism, apparent growing objection to recovery program results on the part of farmers and small manufacturers, and other incidents have been grasped by some observers as straws revealing a dangerous trend.

On the other hand, there have been important offsets. Most of the important nations have accepted the German pronouncement with commendable poise. The Johnson "free-speech" episode is matched by Madame Secretary Perkins' clear-cut warning that department of labor representatives have no right to dictate to the press. Also the government announced that it is considering further code revisions to ease the burden of small employers, this being a corrective of the plight of small manufacturers and merchants.

Better Earnings Reports and Signs of Early Aid for Ailing Industries Encouraging

Several other factors bring encouragement. Some commodity prices, after erratic behavior, stiffened last midweek. The department of labor's index of 784 commodities gained 2 per cent in September. Third quarter reports of a number of important industrial corporations are distinctly encouraging. Business failures continue in small number. A more cheerful prospect for the ailing building industry is outlined by competent authorities. NRA officials are evidencing a real desire to bring up strong support for the capital goods industries.



1933 Million Tons	
Sept.	1,775
August	1,890
July	2,020
June	2,106
May	1,929

1932 Million Tons	
Sept.	1,985
August	1,969
July	1,966
June	2,034
May	2,177

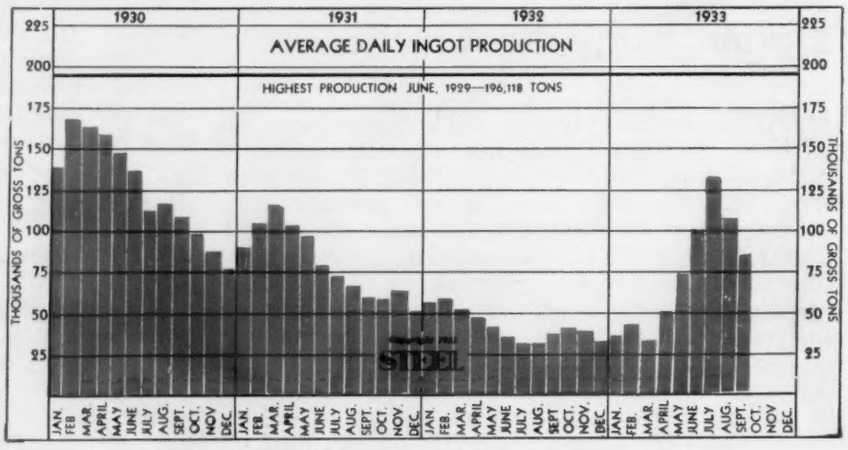
	1933	1932
October 1	$9.05	$6.96
September 1	8.99	7.17
August 1	9.00	6.95

Commodity Price Index Resumes Upward Trend

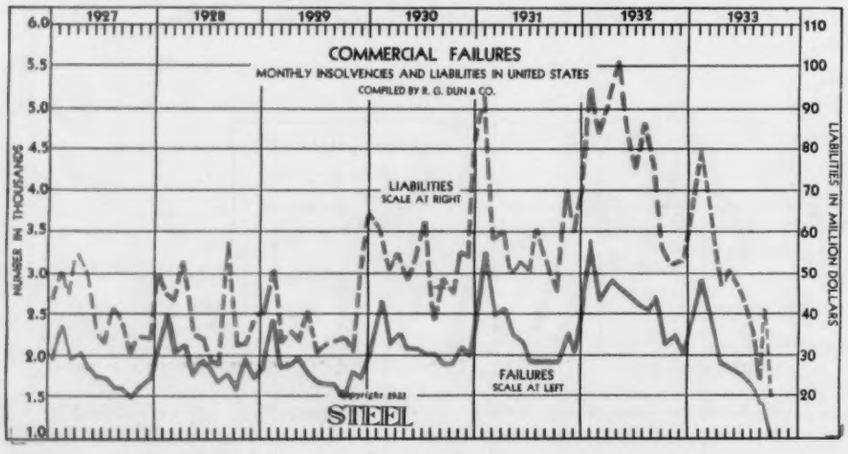
Bradstreet's index of commodity prices again points upward in September, after declining in August. On Oct. 1 the index stood at $9.0512, the highest point reached in over two years, and an increase of 0.7 per cent compared with $8.9918 on Sept. 1. On Oct. 1, 1932, the index stood at $6.96. Since March the index has shown a continuous upward movement with the exception of the August setback which was but a temporary reaction accompanying a rather sharp slump in general business.

Steel Ingot Output Down; Operating Rate 40.9 Per Cent

Production of steel ingots in September declined 17 per cent to a daily average of 88,884 gross tons from 107,430 tons in August. In spite of this decline, compared with 1932, figures for the first three quarters show well for the present year. The average daily rate for nine months in 1933 was 74,698 tons, compared with 44,229 tons in the same period of 1932. According to the American Iron and Steel institute, the rate of operation in September was 40.89 compared with 49.42 per cent in August.



September, 1933	88,884
August, 1933	107,430
September, 1932	38,148



Number		Liabilities	
September, 1933	1,116	Sept., 1933	$21,846,906
August, 1933	1,472	Aug., 1933	42,776,049
September, 1932	2,182	Sept., 1932	56,127,634

September Business Failures Lowest Since 1920

Business failures in the United States during September declined to the lowest level since November, 1920. According to Dun & Bradstreet Inc., there were only 1116 insolvencies during September involving a total indebtedness of $21,846,906. During the same month last year there were 2182 defaults with liabilities aggregating $56,127,634. The reduction in liabilities last month was largely due to the comparatively few large failures while a year ago in September the number of large defaults was unusually high.

CONTINUOUS FURNACE BRAZING OF STEEL

BY C. L. WEST
Research Engineer, Electric Furnace Co.

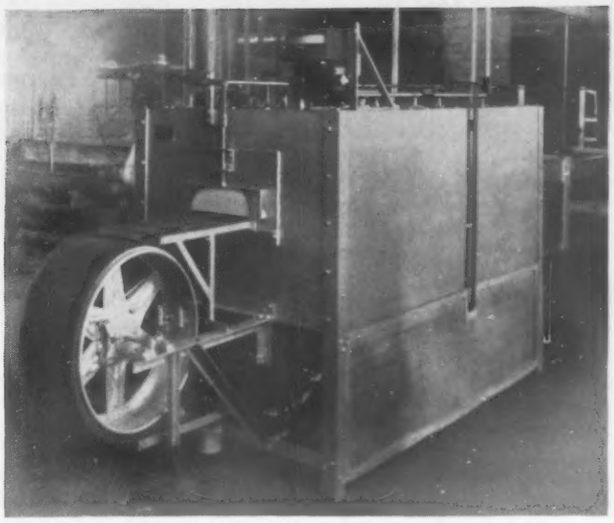


Fig. 1— A continuous mesh-belt conveyor furnace for copper brazing and silver soldering

CONTINUOUS electric furnace brazing for joining two or more steel parts into a single assembly is a process of comparatively recent development. By this process, parts to be united, such as stampings, forgings and screw machine parts, are fitted together, a brazing medium is applied, and the assembly is heated in a reducing atmosphere to a temperature ranging between 1400 and 2100 degrees Fahr. The medium melts and flows into the joints and as the piece is cooled in the same atmosphere to a temperature at which it will not oxidize in air, the metal in the joint solidifies to effect a permanent bond.

Unfortunately, the cost of the necessary furnace atmosphere to protect the parts from oxidation during brazing has been high and, therefore, application of the process has been more or less limited Recently, the Electric Furnace Co., Salem, O., has developed an inexpensive gas atmosphere and necessary furnace equipment which is suitable for maintaining the required atmosphere during the operation. The economic field of the process thereby is widened materially.

Examples of furnace brazed products are shown in Fig. 2 and include automotive pulleys; mufflers; refrigerator parts such as evaporators, condensers, absorbers, receivers, cover plate assemblies for brine tanks, floats, filters and check valves; radiator cores; golf club shafts; tennis racket frames; and the like.

Brazing materials include silver solders, brass alloys and copper. Silver solders have a comparatively low melting temperature of 1400 to 1600 degrees Fahr. and are used where higher temperatures would be detrimental to the parts forming the assembly. These solders

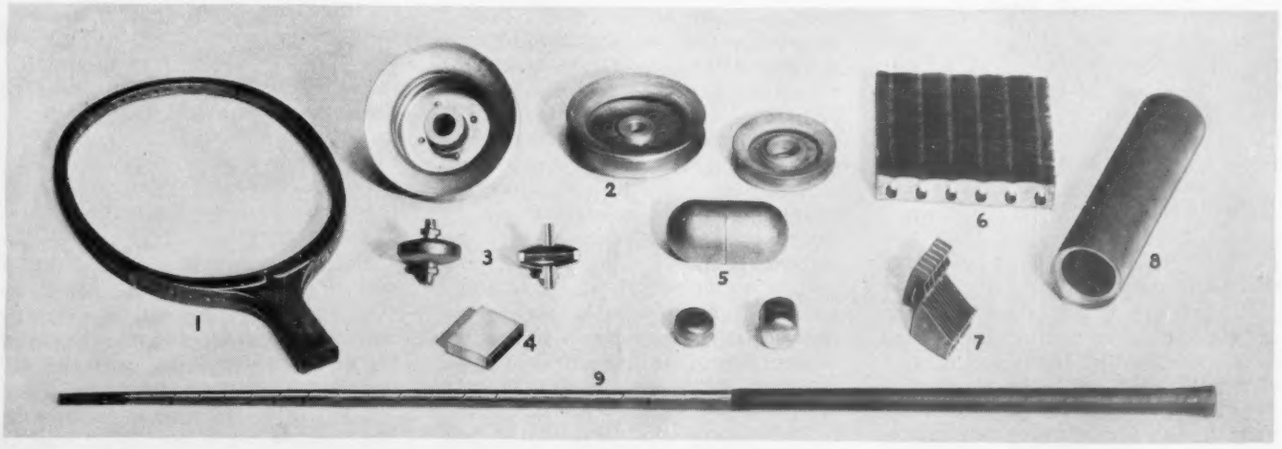


Fig. 2—A group of miscellaneous products joined by the continuous electric furnace brazing process. Descriptions of these assemblies and details of brazing are given in the accompanying article

form a strong bond between steel and other metallic parts. The material is furnished in wire or thin ribbon form at a cost of approximately $2 per pound and frequently is avoided on the basis of its cost if less expensive alloys can be used satisfactorily.

Brass wire and powder of a composition of copper and zinc are used extensively when a strong bond between the parts is the prime consideration. Brazing with brass wire is accomplished at a temperature of 1740 degrees Fahr. in most cases, and the resultant joints have all the normal strength of mild steel. Where brass powder is used, the temperature closely approaches 2000 degrees Fahr., due to the rapid volatilization of free zinc from the powder at elevated temperatures, with resultant increase in the melting temperature of the residue of the copper-zinc mixture when the steel parts finally reach the brazing temperature.

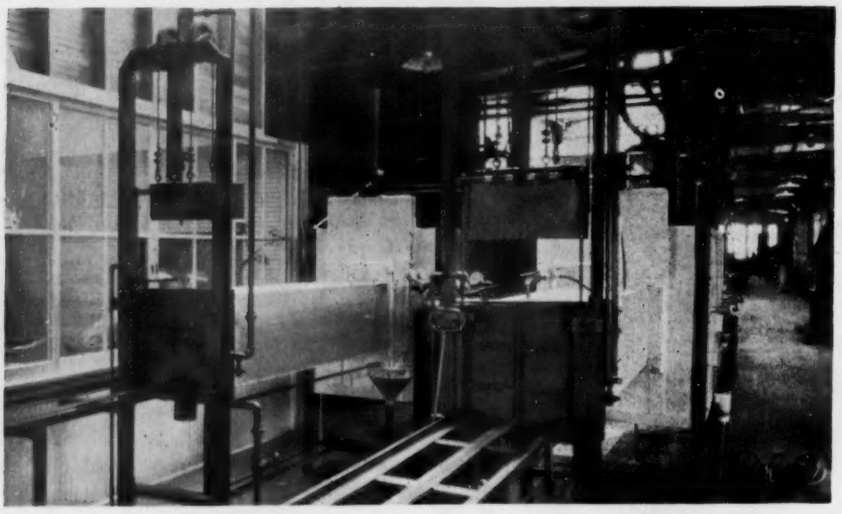


Fig. 3—Two pusher-type furnaces—one of several types built for continuous brazing

Some Failures with Brass Alloys

Brass alloys are inexpensive and for all general purposes can be obtained at a cost of approximately 15 cents per pound prepared for use. These alloys are not always satisfactorily for brazing refrigerator parts which contain gases or liquids and are subjected to relatively high pressures. Tests usually are from 600 to 1000 pounds. The reason for their failure probably is due to the fact that the brass alloys continue to give off zinc during the entire brazing cycle, that is, up to the time of solidification, with the result that minute pores sometimes are found to exist in the film of alloy left in the joints after brazing. These failures are not necessarily frequent, but they cannot be countenanced in the manufacture of refrigerator parts, and other mechanisms where high pressures are encountered. For this reason, commercially pure copper is used in the brazing of such parts.

Pure Copper Widely Used

Copper in the pure state offers the most perfect brazing medium where the strongest and tightest bonding of steel parts is essential. Copper is used in wire, ribbon and powdered form, and as it is free from alloying agents, the melting temperature is consistent in any form. The disadvantage of using copper is that the operation is carried out at the high temperature of 2100 degrees Fahr., which naturally tends to increase the maintenance cost of furnace alloys over that encountered at temperatures of 1740 degrees and lower. The cost of copper at the present time in the form of wire is 10 cents per pound, and in the powdered form, approximately 16 cents per pound.

Parts which are to form a brazed assembly should be fabricated in such a manner that the joints fit closely together. Light press fits are desirable, and extremely tight fits will not prohibit but rather will aid toward a perfect flow of the brazing material into the joint. Capillary attraction plays an important part in the brazing operation and hence the tighter the joint, the farther the molten metal will flow. Void spots or gaps in an assembly always are difficult and many times impossible to seal due to the dependence upon capillary attraction for drawing the molten metal into the joints.

The parts must be clean if 100 per cent effective brazing is expected. The reducing action of the gas atmosphere used in these furnaces normally will clean the parts of light oxides or oil and soot films; however, heavy scale or oil deposits should be removed from the parts before assembly. A heavy scale, even if thoroughly reduced, would leave a film of absorbent iron on the surface, and the possibility of the molten copper penetrating through this film and bonding with the solid steel is doubtful. Where such a union may be possible with excessive amounts of copper, the result would not always be dependable. Heavy oil, grease or soot deposits are likely to leave upon the surface of the metal a deposit of carbon, which is an enemy of good brazing.

Furnaces of quite simple design have been installed for brazing. For operations up to 1800 degrees Fahr., an electric furnace utilizing a belt conveyor of heat-resisting alloy is commonly used for heating and conveying the work. When temperatures are as high as 2100 degrees Fahr., simple and practical pusher types of furnaces usually have been employed, in which the work is conveyed through the heating and cooling chambers on light shoes or trays of heat-resisting alloy.

Heating and Cooling Chambers

The equipment in any case consists of a heating chamber in which the work is heated to the desired brazing temperature and a cooling chamber attached to the heating chamber through which the work passes after leaving the furnace proper. The cooling chamber usually is of double steel shell construction, the inner chamber being filled with the gas atmosphere. Water is circulated betwen the inner and outer shells as a means of forcing the cooling of the material to a satisfactory discharging temperature in the shortest possible time.

Until recently hydrogen gas was used almost exclusively for the reducing atmosphere in electric brazing furnaces. This type of gas has satisfactory reducing qualities, but is a serious decarburizer at elevated temperatures and cannot be used in the presence of steels with which decarburization is an important factor, except by special preparation of the parts, such as electroplating the surfaces before processing in the hydrogen atmosphere.

Hydrogen gas is obtained at a cost of from $3 up to $10 per thousand cubic feet, depending upon the methods of producing the gas and the quantities used. A small furnace installation may require from 300 to 500 cubic feet of gas per hour, with the result that when using gas of this cost, the furnace design, with regard to entrance and exit openings,

may become rather complicated in order to use the gas sparingly.

The low-cost reducing atmosphere developed by the Electric Furnace Co., therefore, is an important contribution to the brazing process. This atmosphere is generated at the brazing furnace location, utilizing a gas producer of a size to suit each installation.

The cost of this reducing atmosphere may vary from 20 to 30 cents per thousand cubic feet, depending upon the cost of electric energy and base materials in the locality where the gas is produced. It can be appreciated readily that such an inexpensive gas atmosphere can be used somewhat more extravagantly than the more expensive gases, and taking advantage of this fact, it is found that the furnace equipment can be of relatively simple character, which results in lower first cost and lowered operating and maintenance costs.

To illustrate the operation, let us assume that we have a continuous belt-conveyor type electric furnace with reducing gas atmosphere and the operation is to braze an automobile fan hub and pulley assembly. The parts are assembled with a light press fit and a single strand or ring of brass wire 1/32-inch diameter is placed around the hub at a point adjacent to the steel pulley. The assembly is placed upon the conveyor belt and moved into the furnace, which is operating at a temperature of 1740 degrees Fahr.

Contact Surfaces Wetted

At approximately three-fourths of the distance through the furnace, the steel parts reach the furnace temperature and the brass alloy then is in a liquid state. Capillary attraction now comes into play, and the molten metal is drawn through the joint between the pulley and the hub and further forced out under the flange, thus wetting the entire surface in contact and the surplus forms a fillet at each end of the joint. The work moves out of the furnace and into the cooling hood, during which time the film of iron and copper alloy in the joint solidifies. The work then is cooled to approximately 250 degrees Fahr. in its passage through the cooling hood and the job is complete.

The strength of the brazed joint in this case many times exceeds the requirements, as is evidenced by the report from a prominent automobile manufacturer. Two fan pulleys were installed on road cars and a third was sent to the metallurgical laboratory for test. The ones on road cars are still running without complaint as to their service. The one in the laboratory gave results as follows:

In a torsion test, a load of 5160 foot-pounds was applied and the weld still held, the ¾-inch diameter shaft failing. The pulley then was held on the outside of the hub and a load of 7190 foot-pounds was applied; the weld again held, the bolts on the driver shearing. The test was discontinued, it being the opinion that the weld had a satisfactory safety factor under the actual working load.

The area involved in the brazed joint in these pulleys was only 0.77 square inch, as the flange of the hub had been reduced from 2⅜ to 1½-inch diameter, when the brazing process was adopted to replace projection welding.

These parts previously had been joined by projection welding at four points in the wider flange. A number of failures in service have been encountered where hub flanges and pulleys have been projection welded due to crystallization of the steel in the immediate vicinity of the welded portion and strains set up in the steel from localized heating at high temperatures. The failures were a breaking of the crystalline structure around the outside of the welds caused by fatigue from vibration of the parts at high operating speeds.

Given Normalizing Treatment

The brazed pulleys are uniformly heated all over to a normalizing temperature of 1740 degrees Fahr., which serves the purpose of relieving all cold working strains from drawing, punching and spinning operations, at the same time that the brazing operation is performed. The cost of projection welding is slightly less than brazing with regard to the average pulley, but improvement in quality of the brazed product more than justifies the slight increase in the cost of the operation. A final economy is found in the average pulley assembly due to the fact that the hubs can be produced from much smaller bar stock than was possible with the old types of assembly.

Fig. 5 shows the result of another test and how the brazed joint proved even stronger than the original parts. It will be noted that the steel pulley failed while the brazed joint held securely.

Assemblies Cover Wide Range

While it is not possible in this article to discuss a large number of brazing applications, it is of interest to describe briefly several assemblies shown in Fig. 2 and the methods used in joining them by continuous furnace brazing. The outer part of the tennis racket (1) is of 24-gage sheet steel. The inner part is one piece of 26-gage steel. The parts are assembled with a strand of 24-gage brass wire included in the joints and brazed at a temperature of 1740 degrees Fahr. in an electric furnace, then reheated to 1575 degrees, quenched in water and drawn at 600 degrees.

Fig. 4—A rotary-type furnace brazing automobile hub parts

The three pulleys (2). made by the Spun Steel Co., Canton, O., were brazed with brass wire at a temperature of approximately 1740 degrees Fahr. The pulley on the left had been cupped for projection welding on four spots as indicated by the raised spots around the hub. This previous welding method required a flange 3⅜-inch in diameter. With the present continuous-furnace brazing method it was possible to reduce the size of this flange or hub to 1½-inch diameter. The new hub has a flange only ¼-inch larger in diameter than the pierced hole in the pulley, thus leaving only ⅛-inch per side in contact with the pulley web.

The reduction of ¾-inch in bar

diameters for making the hub resulted in a substantial saving in the cost per assembly. The pulley shown in the center formerly was riveted. The outline of rivet holes clearly indicates the size of flange which was used. The hub now used shows the reduction in size of the flange or hub made possible by the brazing method, and the greater strength is indicated by the previously reported test.

The filters (3) are made of low-carbon steel in nine separate parts all joined in a single brazing operation. Two stampings form the outer shell, two screens are spaced between the halves of the shell with three washers, and a pipe fitting is fitted to each end.

The parts are machined to fit snugly together and assembled with a small amount of copper paint applied to the joints. The assembly is then mounted vertically on an alloy plate to which is welded short pieces of wire which project about ½-inch into the lower fitting.

The parts then are passed through a continuous electric brazing furnace at 2040 degrees Fahr. in a protective gas atmosphere and leave the cooling chamber as completely joined and sealed units, capable of withstanding upward of 1000 pounds per square inch pressure.

Bronze Brazed to Steel

No. 4 shows a piece of 1045 steel, measuring ½ x 2 x 2 inches, on to which is brazed a strip of manganese bronze 3/32 x ½ inch. The parts are assembled with a ribbon of silver solder 0.003 x ½ inch between the two, heated to 1500 degrees Fahr. in the reducing atmosphere and quenched from temperature in water. The steel was hardened, and the steel and bronze strip were brazed so tightly that it was impossible to separate the parts without cutting. The purpose of this test was to prove the possibility of brazing a bronze liner in a friction bearing.

The larger float (5) was made of two brass shells and assembled with a strand of 24-gage silver solder wire at the junction of the two halves and brazed at a temperature of approximately 1500 degrees Fahr.

The smaller floats (5) were made of 0.015-inch thick copper coated steel sheet, furnished by the Pittsburgh Cold Rolled Steel Co., Pittsburgh, and are made in two shells, assembled as shown and brazed at 2040 degrees Fahr., utilizing the copper coat on the steel for making the necessary seal in the joint. The floats shown are miniature models of floats commonly used in electric refrigerators.

The condenser core (6) was made of 0.008 x 1-inch sheet steel. The strip was cupped as indicated on the front on top of the core. The cups are slightly tapered, allowing for the stacking of a great many strips or laminations to form the desired height. When the stack of strips is lightly pressed together the cupped portions form a number of tubes through the assembly.

Fig. 5—A laboratory test of an automobile fan pulley which shows that the brazed joint is stronger than the original parts

A single strand of 20-gage copper wire is placed laterally through each tube and the assembly is conveyed through the furnace in a flat position at a temperature of 2040 degrees Fahr. The wire flushes as the assembly reaches furnace temperature, and the liquid copper is drawn around each of the several hundred joints by capillary force, and the core becomes a completely sealed unit.

The muffler (8) is made up of five pieces—four stampings and the outside shell. This model is about one-half the size of a regular truck muffler. They are made of either copper-coated steel or plain cold rolled steel sheet. The shell may be either lock-seamed or lap-seamed and spot welded in three or four places to hold it in normal shape until brazed. The vanes or internal parts are then pressed into the shell in their proper positions and the assembly is ready for brazing.

Spray on Brazing Medium

Where the parts are made of copper-coated sheet, the brazing medium is the copper on the steel. Where plain cold rolled steel is used, the inside is sprayed with a paint made of copper, lacquer and lacquer thinner, in sufficient quantities to form a thin film over the surfaces. The assembly then is heated in a reducing atmosphere in an electric furnace to 2040 degrees Fahr. and the part after being cooled is removed from the furnace with all parts completely joined into a unit with a film of copper alloyed over the entire surface.

The golf shaft (9) was made of high carbon steel strip spirally wound into a tube and silver soldered between laminations at approximately 1600 degrees Fahr. It was then reheated for hardening in protective gas atmosphere and quenched at 1475 degrees in oil, then drawn in protective gas atmosphere at 600 degrees.

Annealing Is Practical

In conclusion, it may be said that it is entirely practical to anneal or heat treat brazed assemblies at the same time as the brazing operation is performed or to reheat for quenching or drawing separately after the parts have been brazed, provided that such reheating is at temperatures lower than the brazing temperature used in joining the parts. Tennis racket frames of S.A.E. 4130 sheet steel have been brass wire brazed at a temperature of 1740 degrees Fahr. and quenched in water after dropping the temperature of the frame to 1600 degrees, with satisfactory results and with no apparent change being noted in the brazed joint.

Where it is desired to cover the entire surface of steel parts with a coating of copper or where the joints are not accessible to the application of wire, then the copper is applied by means of a spray gun or a brush with a paste made up of the copper powder and lacquer or lacquer thinner.

It is possible to braze almost any desired number of joints in any assembly within the limits of possibility of holding the parts together during the brazing operation. The most intricate parts or assemblies are made actually to grow together, and joints are made which are even stronger than the original parts. Products requiring several stampings joined together or requiring screw machine parts, forgings and stampings to complete the unit, may be neatly and economically joined by the continuous brazing furnace method with equipment set up in the production line.

Theatre Curtains of Steel Efficient Against Fire

Theatre proscenium curtains made wholly of steel or of two-ply asbestos cloth with steel frames are claimed to provide maximum fire protection to audiences, according to an investigation recently made by the bureau of standards, Washington. Steel curtains, it was found, would insure safety for a half-hour while steel-framed asbestos curtains could be depended on for about half that time.

Steel Constructors Consider Engineering Problems

ENGINEERING problems of the steel construction industry were discussed in the Thursday afternoon and evening sessions of the eleventh annual convention of the American Institute of Steel Construction Inc., held Oct. 19-21 at the Stevens hotel, Chicago. The highlights of the technical program included the description of a new idea in suspension bridge design featuring economy in the use of materials, discussion of a recently introduced alloy steel for structural use and a symposium which reflected present trends in the application of steel for small house construction.

According to Dr. D. B. Steinman, consulting engineer, New York, the Sky Ride at the Century of Progress Exposition marks a new era in structural engineering. He declared that it opens for the bridge engineer a new field of low-cost long-span construction, suitable for many locations where the traffic is insufficient in volume to justify the many times greater cost of a bridge following conventional design.

Stresses Three Features

Dr. Steinman named three outstanding technical features of the Sky Ride:

1. For the first time a long span has been designed and constructed with a suspension stiffening system composed exclusively of tension members, in this case steel wire rope strands. The substitution of an efficient steel-rope system for the usual stiffening truss of built-up steel compression members produces a new form of safe span construction while establishing a new mark for lightness and economy.

2. The observation towers, 628 feet high, constitute the highest steel structures in which welded construction has been applied and the first bridge towers in which welding has been extensively utilized. The adoption of welding has influenced the design and has yielded new economical forms of sections for the main structural members and the bracing members.

3. For the first time in bridge construction, balanced rocking counterweights are used instead of immovable mass anchorage for a cable system. The use of the pivoted counterweights establishes a constant predetermined tension in the track cables for all conditions of temperature and loading, thereby giving definiteness of stress and automatic protection against any possibility of overstress.

W. F. Barnes, president, St. Louis Structural Steel Co., East St. Louis, Ill., presented an analysis of small plant production.

Talks New Alloy Steel

W. B. Miller, consulting engineer, Union Carbide & Carbon Research Laboratories Inc., New York, presented an extensive discussion of cromansil steel. This steel is an alloy of chromium, manganese, silicon and iron which is particularly adapted to use in fabricated steel construction.

It was first developed in 1929 and after extensive tests was placed upon the market in 1930. Its properties gradually were recognized by engineers and today it is being accepted for special structures and is being introduced to bridge engineers.

Mr. Miller described the composition and physical properties of cromansil in the "as rolled" condition, including the desired compositions for different applications such as staybolts, rivets, boiler plate and structural steel, high strength tubing and heat treated parts. In connection with the use of cromansil for rivets, readers will be interested in the results of tests reported on page 27 of the Oct. 2 issue of STEEL by A. E. Gibson, vice president, Wellman Engineering Co., Cleveland.

Data on Welding, Riveting

In dealing with the fabrication and shop use of cromansil, Mr. Miller touched upon the behavior of the steel under punching, shearing, threading and welding operations. In discussing welding by the oxyacetylene and metal arc processes he presented data on the strength and ductility of welds in plate material. Mr. Miller stated that cromansil steels are readily cut by the oxyacetylene cutting process and that the material, while of high strength, is less susceptible to hardening on the cut edge than are other steels of similar strength.

Mr. Miller devoted considerable attention to riveting. He presented data showing unusually good physical properties of cromansil rivets and riveted joints in cromansil plates using cromansil rivets. He also presented data on the shearing strength of driven and undriven rivets.

Because of the timeliness of this discussion of a new steel which rapidly is gaining favor in the steel construction field, STEEL will present Mr. Miller's paper in an early issue.

Sees Hope of Steel House Resting in Design of Nonstandardized Type

TRENDS in the development of steel house construction in Germany, France and the United States were discussed in a symposium, "Steel for Residences," held Thursday evening. F. T. Llewellyn, United States Steel Corp., New York, presided as chairman.

In introducing the subject, Mr. Llewellyn commented on the numerous systems of construction presented by their advocates as offering a panacea for all the ills of the housing industry. Some investigators, he declared, have assumed that the future of steel in residences lies in the so-called prefabricated or mass production house. Others, he said, have asserted that the solution is to be found in the utilization of standardized parts.

Mr. Llewellyn, while stating he is not opposed to these efforts, declared that in his opinion the future development of steel in this field will be found in houses of "individual, nonstandardized design, as distinguished from the mass production house, and," he added, "I look to architects, builders and local fabricating shops as the natural and most promising avenue of exploitation."

"I believe that the policy followed by steelmakers 40 years ago in the field of tier buildings should be revived with suitable modifications to meet the particular needs of small residences. The policy then consisted in making available a suitable variety of rolled steel sections, with simple rules and tables to facilitate their use, and encouraging a large number of architects and engineers to make such application of them as the individual character of each structure dictated. While the application of this policy to residences is not as sensational as some that have been offered, it has the merit of making available for immediate use by a large number of people the results of an intensive study of the present problem based on experience accumulated over many years in other

fields. The simplicity and the previous success of the method appear to be in its favor."

Mr. Llewellyn then described the survey made by a trade research committee drawn from subsidiary companies of the United States Steel Corp. for investigating the demand for steel in residence construction. He enumerated the conclusions of this study, which were reported in STEEL on page 16 of the Aug. 21 issue. Additional information on this report was presented on page 36 of the issue of Aug. 28.

Otto von Halem, German Steel Works Syndicate, Dusseldorf, Germany, discussed the trend of steel construction in his country. He touched upon recent progress in determining suitable working unit stresses, allowances for concrete in computing stresses, determination of wind loads, etc.

He declared that in Germany welding in building construction is mostly confined to the shop, whereas weld connections usually consist of bolts or rivets. Working stresses for welding joints have been raised by about 30 per cent, which allows engineers in Germany to figure 85 per cent for compression, 75 per cent for tension and 65 per cent for shear, the percentages being based on the working stress of the parent metal.

Welded shapes frequently take the place of rolled sections. For the construction of large welded I-beams, the Dortmunder Union has rolled flanges with a protusion into which the web is welded and prevents even the slightest warping of the flanges which might otherwise result.

Government Loans Help

Mr. von Halem described several types of building construction now underway in Germany, explaining the methods of financing involved in each case. For many of the projects now underway, government funds are advanced to the home owner. He described and illustrated several types of small house construction, involving steel framing in some cases and steel walls in others. Considerable progress apparently has been made in the development of panels of various materials and in the application of insulating material.

One form of construction, called steel-lamella construction, has met with considerable success. To date 1500 houses of this type have been erected in Germany. The standard building element consists of a steel-lamella about ⅛-inch thick, 45½ inches wide and about 90 inches long, which is flanged on all sides. The flanges, which serve to connect the individual lamellas to each other, act as supporting and stiffening ribs of the wall, which is strong enough to replace a steel skeleton. The insulation consists of panels of cork, timber or cane fibre, seaweed mattresses, hollow tile and the like.

Colonel Louis Incre, Director de l'Office Technique Pour l'Utilisation de l'Acier, Paris, outlined the trend of steel house construction in France. He declared that in 1928 when his organization was formed the use of steel in building construction was in an "almost hopeless state." Gradually the interest of architects and builders was directed to steel and today encouraging progress is being made.

According to Colonel Incre, building is not expensive in France, but because the cost of steel construction is slightly higher than that of concrete construction, the chief argument for the former lies in its rapidity of construction. By use of steel sections, apartment houses, which according to orthodox materials and methods would require 15 months to erect, now are being completed in two months. Some contractors have erected small houses in less than 48 hours.

Colonel Incre expressed the opinion that standard steel sections scientifically used will revolutionize the building industry and open up an important new outlet for steel. The technical knowledge for this development is progressing rapidly. However, considerable educational work is necessary to popularize new construction methods.

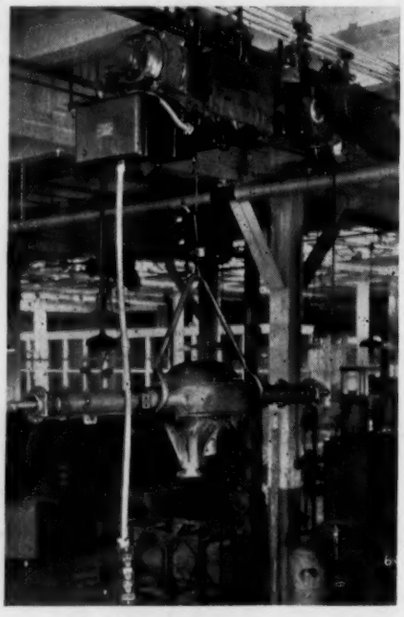
Colonel Incre presented motion pictures of pioneering work in steel house construction in France.

Automatic Hoist and Monorail Tractor Solve Materials Handling Problem

BY E. R. TOZER
Sales Engineer, Elliott Electric Co.

AN INTERESTING application of automatic overhead materials handling equipment was made recently in the plant of the Columbia Axle Co., Cleveland. In rearranging machine units for straight line production, the company was faced with the problem of transporting completely assembled axle units from the end of an assembly line to a loading dock, a traverse of 85 feet at right angles to the production line.

Consultation with engineers of the American Monorail Co. and the Elliott Electric Co., both of Cleveland, provided a solution. A length of light monorail was suspended on beams from the plant ceiling and an old ½-ton electric hoist was revamped to fit the monorail. Attached to the hoist, a light, newly designed tractor also was mounted by a trolley on the monorail. The tractor is a light metal frame within which is a General Electric Co. gearhead motor, mounted upside down and driving by means of sprockets and chain a small airplane tire along the underside of the monorail for traction.



This tractor-hoist actuated by push-button control, lifts and transports axles from assembly line to loading dock automatically

Contactors and limit switches were furnished to give semiautomatic operation. After attaching the hook to an axle the operator at the assembly line pushes the "up" button on the pushbutton station and goes about other work. The hoist automatically raises the axle up to a point where it will clear everything on the floor; thereupon the limit switch cuts out the hoist motor and energizes the tractor motor, which in turn moves the hoist over 85 feet to the unloading station and stops.

Here another operator drops the axle to the dolly by actuating the "down" pushbutton control. He then presses the "up" button, the hoist hook automatically rises and the tractor moves the hoist back to the end of the production line.

By this method production is moved carefully, at a saving in labor and with a moderate investment in equipment. When production is in full swing again at the plant, it is the intention to install twin lines to carry the axles.

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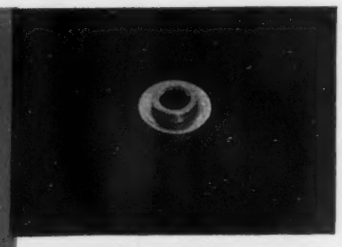

57.1% PRODUCTION INCREASE
9/16" Round, Cold Drawn
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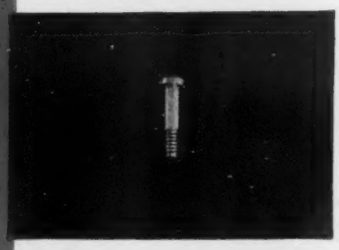
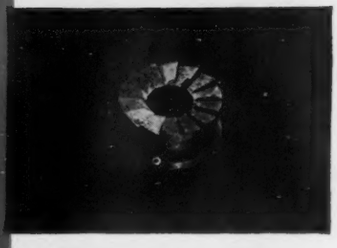
Special High Sulphur
Bessemer Screw Steel



38.5% PRODUCTION INCREASE
11/16" Round, Cold Drawn J & L *Improved*
Special High Sulphur
Bessemer Screw Steel



5% PRODUCTION INCREASE
½" Round, Cold Drawn
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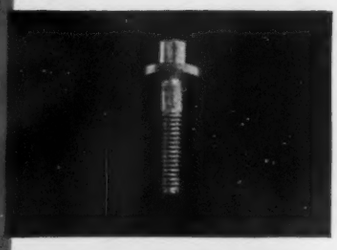

5% PRODUCTION INCREASE
⅝" Round, Cold Drawn
J & L *Improved*
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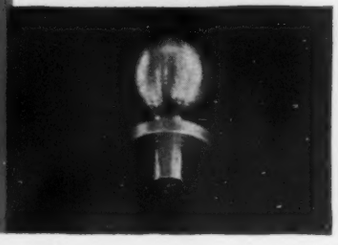

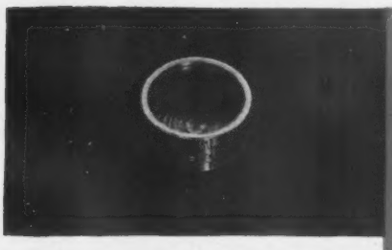

20% PRODUCTION INCREASE
¾" Round, Cold Drawn
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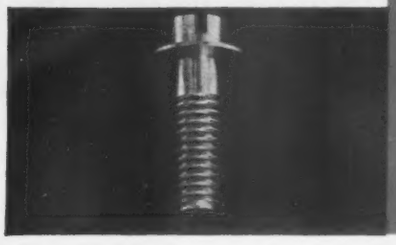

18% PRODUCTION INCREASE
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Steel Mill Engineers Review Past Year's Developments

IN THE years which are to come, this nation will refer to 1932 as one of the leanest of the lean years in the production of steel. The pendulum in its downward swing has passed its lowest point and has started on the upward swing with a momentum such as we were beginning to think never again would be possible. Business is improving and things are happening with unusual rapidity.

Such was the contention of W. H. Burr, electrical and mechanical superintendent, Lukens Steel Co., Coatesville, Pa., whose citation of the "Developments in the Iron and Steel Industry" opened the twenty-ninth convention of the Association of Iron and Steel Electrical Engineers at the William Penn hotel, Pittsburgh, Oct. 17-19. The meeting closed Thursday in a formal reception under the general chairmanship of President W. E. Miller, electrical and mechanical superintendent, Bethlehem Steel Co., Johnstown, Pa.

No Lack of Progress

Luminous flame combustion and one-way fired open-hearth furnaces were mentioned by Mr. Burr as two of the most interesting developments in the combustion field. For the first time a turbine-generator set was designed for outdoor operation. It is a noncondensing unit and produces 6000 kilowatts by reducing the pressure of the 400 pounds steam in a mercury-condenser boiler to 250 pounds for use in the shops. A complete set of instruments for observing and recording the operation of a turbogenerator was installed to supplement the personal element in judging the operation of the unit with instruments that give both a remote indication and a permanent record of turbine performance.

Of interest to steel companies operating electric arc furnaces is development of a motor-operated tap charging switch mounted inside the transformer casing, Mr. Burr stated. Transformers filled with a non-inflammable insulating fluid now are available in sizes up to 500 kilovolt-amperes. Progress was made in the development of automatic equipment for increasing the production of sheet mills by constructing a simple device which permits the roller to get a fairly exact indication of the length of the sheet after each pass. A selsyn transmitting and receiving unit combination was adopted to transmit directly to the pulpit the indication of the position of the top roll on a blooming mill.

A new clapper-type alternating-current brake was developed especially for sheet mill service which will give better than 20 million operations without any major repairs. Of particular interest to users of resistance welders, Mr. Burr pointed out, is the weld timer which automatically controls the heat units put into the weld. Practically coincident with the design of special contactors for sheet mill service has been the design of a line of contactors for welding service. These operate at the rate of 800 times per minute, he stated, intermittently and continuously at the rate of 200 times a minute.

An auxiliary controller for a lifting magnet has been developed. This controller is used in connection with the main magnet controller and is for the purpose of increasing the lifting capacity of the magnet. Recently there was announced the invention of a new type of wire insulation which was developed primarily for low-voltage secondary network distribution. The remarkable performance of the new insulation is attributed to the fact that it contains no organic material.

BECAUSE of space limitations STEEL *is unable to present in this issue reports of all technical sessions of the Association of Iron and Steel Electrical Engineers held in Pittsburgh last week. Concluding sessions of the convention will be reported in next week's issue.*

Recorders Meet New Needs

For observing temperatures in short intervals is the purpose of newly developed photoelectric - type indicating pyrometers. Alternating-current tachometer generators have been devised for the measurement of speed. Last year there was placed on the market a new line of long-distance metering equipment capable of recording over any ordinary telephone line at a distance up to 50 miles, the indication of any standard type of primary measurement element.

In conclusion, Mr. Burr emphasized that developments have improved man's living conditions in recent years so that during the worst period of this depression he was far better off than during the most prosperous years generations ago. Difficulty is not associated with our modern engineering developments, he contended, but with our methods of distribution and human relations.

In commenting on Mr. Burr's paper, J. Farrington, electrical superintendent, Wheeling Steel Corp., Steubenville, O., added that an automatic machine for weighing and assorting tin plate now is in operation which will handle sheets at the rate of 3600 an hour, classifying the product on a tolerance of ⅛-ounce.

A paper reviewing cold mill practices—sheet, tin and strip— by Stephen Badlam, consulting engineer, Pittsburgh, was stamped as one of the most complete papers on the subject ever presented before the association. Mr. Badlam received prolonged applause following presentation of his paper and a rising vote of thanks. He reviewed the design of the early tandem sheet mills built in Europe and this country in the early 1900's and discussed in detail the 12 continuous 4-high mills in this country designed for rolling sheets and strip. These mills, he stated, have a monthly output of 500,000 tons.

Attributes Success to Bearings

Mr. Badlam attributed the success of the 4-high continuous mills to antifriction bearings for the backingup rolls and adjustable-speed motors for the individual stands. At one plant recently completed in this country, 3500 horsepower is devoted to the removal of scale from the surface of the strip. Four systems of flat rolling are used in this country, the author said. Tandem or single; tandem, in train or single using conventional sheet mill rolls; 4-high, non-driven rolls served by power-driven reels; and the single mill-driven roll reversing system. Five mills, he pointed out, are under construction which will employ tension on the strip on both the entry and delivery side, 4-high rolls with the working rolls driven, and two reversing reels.

Mr. Badlam emphasized that tension on the delivery side of the 4-high mill has a tendency to secure flat material and that on the entry side of further removing irregularities on the surface of the stock. Four tension mills with rolls driven will be ready for operation this year, two being located at Gary, Ind., one at Aliquippa, Pa., and one at Indiana Harbor, Ind. In conclusion, Mr. Badlam mentioned that tinning of long strip has not yet been accomplished in this country nor have electrical sheets been rolled on continuous mills.

In speaking on electrical features

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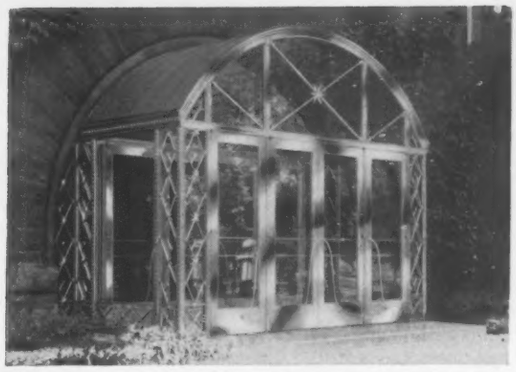

● The beauty of ENDURO adds to the attractive design of the Union Entrance of the University of Minnesota, St. Paul. Fabricated by Stanley Iron Works, Inc., Minneapolis, Minn.

● The unusual was attained by the Union Carbide & Carbon Corporation in their exhibit at A Century of Progress in Chicago by using etched panels of ENDURO.

The University of Minnesota wanted a new entrance for one of its buildings. What metal should be used to give a dignified distinctive appearance? ENDURO was used.

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Our Lady of the Rosary Church, Kenosha, Wisc., requested a cross for the spire—one that time and weather would not affect. That cross is now ENDURO.

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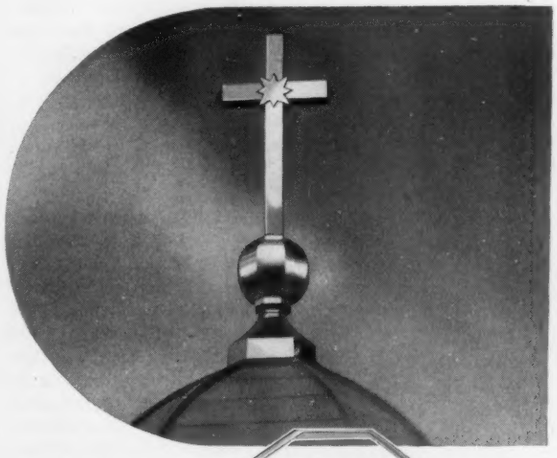

● That this cross atop the spire of Our Lady of the Rosary Church, Kenosha, Wisc., might be everlastingly bright, specifications were changed to ENDURO. Architect: Lindl & Schutte, Incorporated, Milwaukee. Fabricator: Universal Sheet Metal Products Company, Milwaukee.

● The practicability as well as the beauty of ENDURO is exemplified in its use for food cabinets by the Apollo Metalware Corp., New York, N. Y.

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of modern cold roll strip mills, A. F. Kenyon, general engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., described two types of electrical circuits and apparatus for maintaining tension on strip to prevent irregularities. In discussing three types of mill equipment used for producing strip for tin plate, the speaker made it plain that the successful rolling of wide thin strip requires smooth acceleration and deceleration to avoid breaking the stock, both of which are obtained by variable voltage control. It is necessary to maintain the strip under moderate adjustable tension between stands, he stated, to keep the strip centered in the mill and avoid wrinkling.

Reel motors serving single-stand reversing mills, he pointed out, are of large capacity to provide the necessary tension during the early passes when the strip is heavy. Extremely accurate and heavy control is required to regulate and limit the tension during the latter passes to avoid breaking the thin finished piece. To reduce the reel drive inertia to a minimum, special reel motors with small diameter long core armatures are used.

On the earlier type Steckel mills, Mr. Kenyon stated, the necessary back tension was provided by a friction brake on the unwinding reel, but more recently an electrical regenerative braking system has been developed, and a mill using it now is being installed.

Tension Must Be Constant

Constant tension during acceleration and deceleration, both front and back, is extremely important if uniform gage and quality is to be obtained, stated F. Mohler, industrial engineering department, General Electric Co., Schenectady, N. Y. The usual back tension is only 10 to 50 per cent of the pulling tension, he pointed out. The amount of forcing the regulator may be so great, he continued, that it is necessary for the pump-back current of the unwinding reel motor to be reduced to zero and actually reverse so that it operates as a motor during acceleration. Mr. Mohler announced that a regulator has been developed which not only forces in proportion to the rate of acceleration at all times, but will actually allow motor operation of the unwinding reel motor during acceleration.

Semiautomatic preset screwdown control has been applied to cold strip mills whereby it is possible for the operator to set his next pass screw position while he is rolling one pass. At the end of the pass, the speaker explained, he merely presses a button and the screws go to the selected position without further attention. Continuous electric gages have been applied for use with automatic control whereby the screws are adjusted if the tolerance limits are exceeded. A gage of this type was described in the May 1 issue of STEEL, page 42. In conclusion, the speaker mentioned that new generator field control, giving smooth acceleration and deceleration and present control of the threading and running speeds has been developed for adjustable potential tandem and single stand cold strip mills.

Tuesday afternoon's session closed with a paper on "Controlling Screwdown Drafts to the Exact Specifications of the Mill Superintendent" by D. C. Wright, chief engineer, Electric Controller & Mfg. Co., Cleveland. The speaker described a recently developed automatic preset screwdown controller for blooming, continuous, plate and sheet mills, stating that the advantages that could be expected included a uniform product, an improved quality of product, increased production, ability to roll different size ingots without loss of time, and increased efficiency of operators.

Members of the mechanical, electrical and lubrication divisions of the association attended a joint session Wednesday morning at which two papers dealing with "Antifriction Bearings in Connection with Cold Mills" by F. C. Hallmark, general master mechanic, Wheeling Steel Corp., Steubenville, O., and C. J. Klein, chief engineer, Weirton Steel Co., Weirton, W. Va., respectively, were presented. Mr. Hallmark mentioned that the life of antifriction bearings normally is affected by fatigue. He stated considerable difficulty formerly was experienced with this type bearing because of corrosion and heavy drafts on the mill, but this disappeared as design changed. He advocated proper handling and periodic inspection in prolonging life.

Mr. Klein reviewed the early development of antifriction bearings in connection with wide backup mills and pointed out that increased rolling speeds and reduced rolling costs and

(*Please turn to Page* 35)

Exhibits of Mill Equipment Interest Iron and Steel Plant Engineers

INTEREST in the exposition held in conjunction with the twenty-ninth convention of the Association of Iron and Steel Electrical Engineers, was manifested by the large crowds which visited the 55 or more exhibits arranged in the exhibition hall of the William Penn hotel. At a large number of booths was displayed for the first time many newly developed pieces of equipment adapted for use in the iron and steel industries.

One of the latest inspection instruments—the electric gage for determining the thickness of strip during rolling—was displayed at the booth of an electrical manufacturer. This type gage which affords continuous control of the thickness, is being installed at many 4-high mills in this country. An oil blast circuit breaker for steel mill motor starting and jogging service was shown which is good for 10,000 operating cycles of closing and opening 1000 amperes at 6600 volts without any maintenance, contact reconditioning or oil change.

IN THE main lobby of the William Penn hotel a 4-inch I-beam mounted about 6 feet above the floor attracted attention. A magnetic strain gage attached to the beam measured the curvature to a millionth of an inch when the beam was under weight. A man weighing about 175 pounds bends the beam slightly in excess of two millionths of an inch. Also drawing attention was an apparatus which measures in miles per hour the speed of a golf club at the bottom of the swing. This device set many golfers to swinging a driver. By means of a photronic cell the device indicated that the head of the club at the point of impact with the golf ball travels at the rate of 80 to 100 miles an hour.

Circuits Broken Quickly

A new type circuit breaker employs an entirely new principle of arc interruption. The contacts are located in a closed metal chamber and when they separate and an arc is drawn, gases are formed which set up pressure. This so increases the resistance of the arc path that in 0.008-second the arc is interrupted. A trip-free air circuit breaker shown at one booth was built with silver-to-silver main contacts and solid bridging members.

A self-contained electrical device for use in conjunction with hot neck lubricant for lubricating sheet, tin and cold mill roll necks had its initial display at the booth of a lubricating manufacturer. The device is mounted on the mill housing and fits in above the roll necks over their entire length. Blocks of grease rest on a heater element and the flow of grease on the neck is regulated by controlling the current in the electric heater coil by means of a rheo-

stat. Four units and two rheostats are required for each stand of rolls.

A barrel lifting device which enables one man to empty a full barrel of grease into a hopper without shoveling or scraping is a feature of a recently improved stationary grease pumping unit designed to pump heavy roll neck lubricants. The unit was shown in operation.

Automatic continuous measurement of the combustible components of gaseous mixtures was demonstrated at the booth of an instrument maker. The instrument, known as a gas analyzer, uses no chemicals or water and operates automatically from any 110 or 220-volt outlet. It operates under pressure which eliminates effects of small leaks and is unaffected by voltage variations and room temperature. The instrument is adapted for the analysis of the atmosphere of furnaces in which a reducing atmosphere must be maintained, such as in sheet mill furnaces.

A sheet mill automatic catcher and feeder table complete with electrical operating mechanism was shown in operation at the booth of an electrical manufacturer. An automatic preset screwdown controller was seen in operation suitable for a 54-inch blooming mill and providing 863 possible stopping points at 1/16-inch minimum movement.

Various types of antifriction bearings were available for inspection. One display included a 4-row cup adjustable tvpe bearing 30 x 48 x 32 inches and weighing 8500 pounds for a cold tin plate mill in the Pittsburgh district. Another bearing 18 x 32 x 13⅛ x 7 inches for a planishing mill in the Chicago district also was shown.

Handing Equipment Modeled

Models of handling equipment employed at steelworks were shown by two builders and included a ladle crane, an ingot releaser, a door lifter for open hearths, a charging machine, a forging manipulator, a magnet crane, an ingot stripper and a pit crane.

Other devices which invited inspection were a booster magnet control, a new alternating brake for industrial use, an improved brake for sheet mill feeder and catcher tables, open-hearth furnace draft controls, lubricating systems for mills and mill auxiliary equipment, industrial lighting fixtures and signaling devices, photoelectric pyrometers for indicating, recording and controlling temperatures of 1400 degrees and higher, speed reducers, potentiometer recorders and indicators, slip ring motors for air conditioning service, a direct-current adjustable-speed explosion-proof gear motor, a motor-pump unit, industrial trucks, mechanical couplers, housing nuts and screws for rolling mills, crane wheels, coupling blocks and spindles, and various type valves.

Mill Engineers Review Past Year's Developments

(*Concluded from Page* 34)

power consumption were brought about by the application of this type bearing. He cautioned that operators of 4-high mills should not run the screws too tight and pointed out the advisability of lubricating the mill every 15 to 30 minutes. He cited the automatic system of lubrication as the most accurate in the amount of lubrication charged. In conclusion, Mr. Klein suggested that large savings and a more efficient operating force were posible where a separate department is maintained for handling the bearings.

Motors of Higher Speed

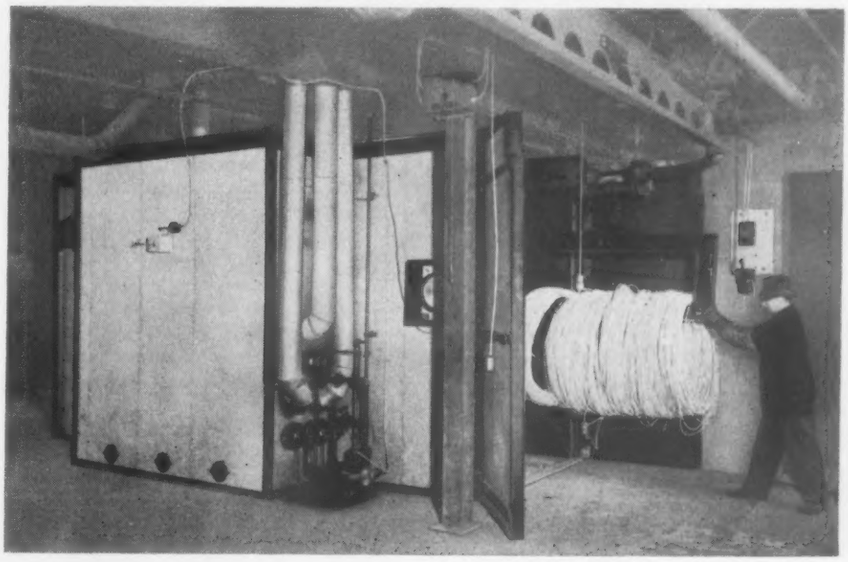
Trend in motor design is toward the high speed rather than the low speed motor, according to T. Holloway, gear consultant, United Engineering & Foundry Co., Pittsburgh, in speaking on "Reduction Gear Sets in Connection with Main Drive Mill Motors." When a load is applied to a straight tooth gear, an uneven number of teeth share the load, and therefore at different parts of the tooth contour the load is unequal and this results after a period of years in uneven wear and a consequent interruption in the transmission of uniform angular velocity. The load of a spur gear, he stated, is greater at the center of the tooth than it is at the tips and roots. This condition can vary in intensity according to proportions, but it remains an inherent characteristic of the spur gear.

Loads applied to helical spur gears, he stated, are uniform from root to tip and this type of gear has a tendency, when it wears, to wear evenly over the entire height of tooth and to operate smoothly even after long sevice. Other sections of Mr. Holloway's paper dealt with herringbone gears and the use of welded steel construction of large mill drives and pinion stands.

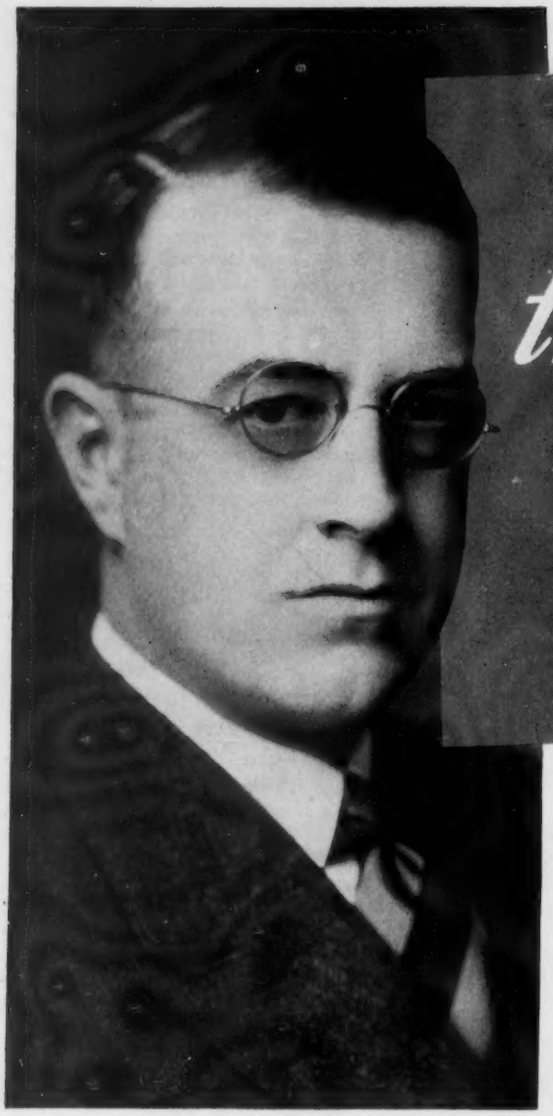
Lubrication Is Important

Factors involved in the installation of gear reduction sets for use with main drive mill motors were presented by A. Kuhns, mechanical engineer, Farrel-Birmingham Co. Inc., Buffalo. With the possible exception of the antifriction bearing, he stated, there cannot be metal to metal contact at the points or areas of pressure in either the meshing gear teeth or in the bearings. Upon the strength of the lubricating film, he emphasized, depends the effective use of materials selected. The success which has been experienced with hardened steels, and the extent to which they are introduced in present designs justifies a more than passing attention to the subject of the film strength of lubricating compounds.

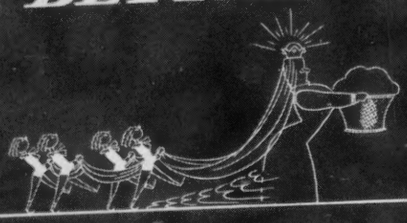
Wednesday afternoon a large delegation visited the plant of the Allegheny Steel Co., Brackenridge, Pa., and the Vandergrift plant of the American Sheet & Tin Plate Co., Vandergrift, Pa.



THIS wire baking oven is equipped with three small burners, each firing into a two-pass combustion chamber. The first pass of each chamber is of cylindrical refractory, high-radiant material and the return pass of finned pipe, thereby giving exceptionally large radiating surfaces. The space occupied by the combustion chambers is insulated from the baking compartment; transfer of heat is by recirculated convection heat. Humidity in the baking chamber is controlled by oven vents and fresh air intakes. Drying time is so accelerated by the rapid movement of air through the work, it is claimed, that a relatively small oven can turn out large production. Designed and built by the Crawford Oven Co., New Haven, Conn., this type of oven rests directly on the mill floor and requires no excavation



HE GAVE the "Queen" A *BETTER* TUB!



A two-minute talk on retail sales promotion by General Manager M. R. Scott of Barlow & Seelig Manufacturing Company

"OUR organization began making washing machines 25 years ago. During that time, it has grown steadily. Even in years when the industry as a whole declined. Last year, it did better than 1931. This year, better still.

"We attribute this unusual gain to a very simple policy. *We give our dealers something out of the ordinary to sell.* We incorporate in our 'Speed Queen' features of extra value. For example:

"An outstanding feature of Model A is the tub. It is made of Monel Metal, the finest tub material available. Can't rust, chip or crack, and withstands corrosion. Its brilliant, silvery lustre resists the strongest soaps and alkalis. The mirror smoothness of its surface outlasts the washer itself.

"But it has a further advantage. For years, Monel Metal has been heavily advertised. The public knows about it; appreciates its value. That makes sales easier for our dealers. Little more is needed to convince Mrs. Housewife that Model A 'Speed Queen' is a quality washer."

In laundering clothes, dyeing textiles, manufacturing drugs, preparing and serving food . . . in guarding against rust or chemical corrosion or severe wear . . . Monel Metal has been universally adopted.

The home owner is not far behind the manufacturer. The washer is only one of several household equipment items being made of this super-serviceable metal. There are also kitchen sinks, cabinet tops, range and table tops and hot water tanks. Each year sees Monel Metal enter a greater percentage of the new kitchens.

In your own business probably rust, wear and corrosion are ever-present hazards. Have you examined the possibility of cutting costs, speeding production or improving quality by the use of Monel Metal?

Give us an opportunity to tell you how others in your own line have gone about this...to their permanent and substantial benefit.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.

NRA WE DO OUR PART

MONEL METAL

MONEL METAL

Monel Metal is a registered trade-mark applied to an alloy containing approximately two-thirds Nickel and one-third copper. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.

The Plastic Forming Of Metals

BY PROFESSOR DR.-ING. ERICH SIEBEL
Translated by JOHN H. HITCHCOCK

Part I—Laws and Fundamentals of Plastic Forming

1. Plastic Condition of Material

IF WE consider a solid body, subjected to external forces which are gradually increased, the body first becomes deformed elastically. If the material concerned is "brittle" under the application of load, then rupture will occur, without appreciable permanent deformation of the body, when the force exceeds a certain limit. If it is "ductile," however, a sufficient increase of load will cause permanent deformations in addition to those which are elastic; the stressed material "flows." In the technical forming processes, the permanent deformations thus produced are so great that the elastic deformations are negligible in comparison.

Structure Is Crystalline

The metallic materials are crystalline. The structure of these materials is composed either of small, similar crystalline grains, or of a mixture of dissimilar crystals, most of which are entirely unoriented with respect to adjacent crystals, and which have grown out to join one another at the grain boundaries. Assuming sufficient fineness of grain, the material concerned behaves during deformation as a homogeneous, isotropic body. For a complete understanding of the behavior of materials, however, it is necessary that their crystalline structure be kept in mind.

As is known from tests of single crystals, and by metallographic observation of polycrystalline strained bodies, the deformation of individual crystals is followed by translation or by the formation of twins along certain distinctive crystallographic planes; so that, by means of sliding along many mutually inclined planes, each desired condition of deformation can be produced.[10] The shear stresses which are required to produce this sliding differ in magnitude, depending upon the deformed material, and bear a relation to the temperature as well as to the actual displacement itself.[11]

Because of the nonuniform orientation of the crystals, deformation under the increasing load to which the entire body is subjected does not begin simultaneously in all grains. The deformation occurs much more readily in those grains which are so oriented that the crystallographic directions of sliding coincide with the directions of the maximum shear stresses. If the phenomena of instability in certain heterogeneously-constructed alloys be excluded, the plastic condition thus spreads gradually over the entire body. Inasmuch as all grains form part of the same material, and must therefore undergo approximately equal total deformation, all grains are subjected to a condition of stress under which they flow. Because of the varying orientation of the grains, the stress condition produces local differences, although with sufficient fineness of structure the deformation appears outwardly to be uniform.

Tests Show Plastic Conditions

Tests have been made by G. Sachs[12], on the theoretical relation between the resistance to shear along the crystalline slip planes and the stress condition of the entire body in plastic deformation. By means of these tests, the relations for metals having a regular face-centered cubic lattice are calculated statistically. Generally valid conclusions, however, probably cannot be derived at the present time. On the other hand, direct tests on metallic bodies have provided information concerning the significant conditions of the plastic state; that is, upon the stress conditions under which plastic deformation occurs[7].

As has been seen already, deformation of the individual crystalline grains begins as soon as the applied shear stresses in the crystallographic slip planes exceed a certain limiting value. Because of the random arrangement of individual crystals in polycrystalline metallic bodies, no especially favored directions ordinarily exist. The deformation is able to proceed, therefore, by the occurrence of slipping along planes which are subjected to the greatest shear, the position of which is determined by the stress condition of the body. For the existence of the plastic condition, the resistance to shear of the material in question is then decisive, which must be overcome if a permanent deformation is to be obtained.

Develop Deformation Strength

The maximum shear stress in a body amounts to one-half of the difference between the maximum and minimum principal stresses. If the principal stresses σ_1, σ_2, and σ_3 are arranged in sequence from $+\infty$ (tension) to $-\infty$ (compression), the described condition of plasticity can also be expresed in the form:

$$\sigma_1 - \sigma_3 = 2\varkappa = k_f \quad \ldots\ldots (1).$$

In this expression, $\varkappa$ represents the resistance to shear of the material, and k_f represents the principal stress difference which is required to produce the plastic condition, or the deformation strength. An infinite variety of stress conditions may accordingly satisfy this condition of plasticity, because one of the two principal stresses σ_1 and σ_3 may assume any

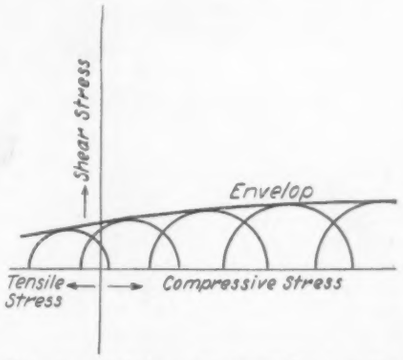


Fig. 1.—Mohr's representation of the limiting stress conditions of a plastic material

value, whereby the other is so determined in the region of flow that the condition of equation (1) is satisfied. The plastic condition is not affected, according to these assumptions, by the magnitude of the intermediate principal stress (σ_2).

The prerequisite for the deformability of a material is its capacity for the formation of crystalline slip planes, along which displacements can take place without destruction of the atomic cohesion. This capacity is large in most metals, but in other crystalline substances, such as stones, it is quite small or wholly absent. The tests

[10]M. Polanyi: Uber Strukturanderungen in Metallen durch Kaltbearbeitung; Z. Phys. 17 (1923) p. 42/53.

[11]E. Schmid: Werkstoffverformung und-festigkeit; Phys. Z. 31 (1930) p. 892.

[12]G. Sachs: Zur Ableitung einer Fliessbedingung; Z. V. d. I., 72 (1928) p. 734.

[7]A. Nadai: Der bildsame Zustand der Werkstoffe; J. Springer, Berlin, 1927.

of Th. v. Karman[13] and R. Boker[14] with marble and sandstone have shown that even such substances, which are completely brittle under ordinary methods of loading, become ductile when subjected to a presure of many thousand atmospheres from all sides. The capacity for deformation of these materials thus increases with increased pressure. The deformation strength of these substances, that is, the principal stress difference which is required to produce permanent deformations, is increased simultaneously.

O. Mohr[15] has represented these relations in the manner shown in Fig. 1. If the principal stresses σ_1 and σ_2 which exist at a point are plotted on the axis of abscissas of a rectangular co-ordinate system, as ordinates of

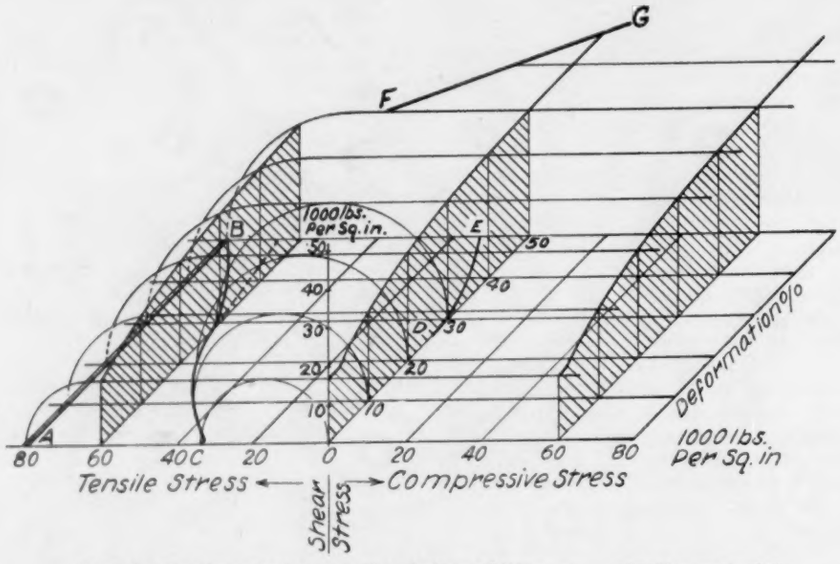


Fig. 2—Representation of the deformability of a plastic material

which the shear stresses are chosen, and if the terminals of the principal stresses along the abscissa are connected by a circle; then the radius of the circle represents the maximum shear stress, which is inclined at 45 degress to the principal stress direction. If all the principal stress circles which correspond to the inception of plastic deformation are drawn in this way, it will be observed that these circles have a common envelope. The course of this envelope indicates the totality of the limiting stress conditions. In very ductile metals, the described envelope lies almost parallel to the axis of abscissas, so that the inception of the plastic condition in such cases is almost independent of the average pressure $p_m = -\frac{\sigma_1+\sigma_2}{2}$.

On the other hand, in bodies of limited ductility, such as stones, as previously described, there is a pronounced dependence upon the average pressure.

If the described method of representation is to be valid not only for the inception of plastic deformation, but also for subsequent deformation, it must be enlarged by the addition of the deformation as a third co-ordinate[16]; because the deformation strength depends as a rule upon the magnitude of the deformation, and increases with increasing deformation (work-hardening). This enlargement leads to the space diagram, shown in Fig. 2, for the deformability of a material. An enveloping surface formed by the principal stress circles is here substituted for the enveloping line, and the magnitude of the deformation resistance, for each condition of stress and deformation, is determined by a stress circle which is tangent to this surface. The principal stress circles which correspond to tensile tests are shown in Fig. 2. The course of the principal stress is represented geometrically by the curved lines *CB* and *ODE*.

The stress conditions under which plastic deformation according to equation (1) appears possible, are subject to limitation by the fact that a separation of the material occurs if the tensile stress in any direction exceeds a limiting value which is a characteristic of the material considered. The existence of a tensile stress greater than this limiting value inevitably produces a fracture at the point in question. The greatest value of the permissible tensile stress usually depends quite definitely upon the conditions of deformation, and is indicated in Fig. 2 by the line *AB*. This line represents the limit, on the side of tensile stress, of the possible stress methods by which plastic deformation can be produced. With regard to deformation, however, a limitation must also be expected.

Deformation can destroy the cohesion of the material, as a result of local separations in the crystalline slip planes, which are first formed or enlarged, and then lead to fracture as deformation is carried further.[17] As the tests on stones showed, the introduction of fracture is delayed the longer, the higher the average pressure $p_m = -\frac{\sigma_1+\sigma_3}{2}$ under which deformation is carried on. If the cohesive strength becomes less than the resistance to shear which is developed by the deformation, fracture occurs along the planes which are subjected to the greatest shear stresses. In Fig. 2 the corresponding limit is represented by the line *FG*.

Velocity Important Factor

A factor of great influence in determining the capacity for deformation and the deformation strength of a material is the velocity of deformation, which is not shown in the method of representation just introduced. With increasing speed of deformation, both the developed resistance to shear and the principal stress difference become greater, and the enveloping surface assumes a different position than in slower deformation. Naturally, these influences are accompanied by an increase of the susceptibility to fracture and by a reduction of the deformability. The possibility exists that the representation shown in Fig. 2 can be enlarged by drawing in additional enveloping surfaces with the accompanying limiting lines, which are valid for higher speeds of deformation, in order to obtain a comprehensive picture of the deformability of a material.

Up to the present time, the influence of the intermediate principal stress has been wholly neglected in the treatment of the stress relations in plastic deformation. However, more recent tests by M. Ros and A. Eichinger[18] and particularly by W. Lode[19], have shown that the relative position of the intermediate principal stress, with respect to the maximum and minimum principal stresses, is of significance; and that the theory of deformation energy, according to which plastic deformation begins as soon as

[13]Th. v. Karman: Festigkeitsversuche unter allseitigem Druck; Z. V. d. I., 55 (1911) p. 1749; Forsch.-Arb. No. 118.

[14]R. Boker: Dissertation, Aachen 1914.

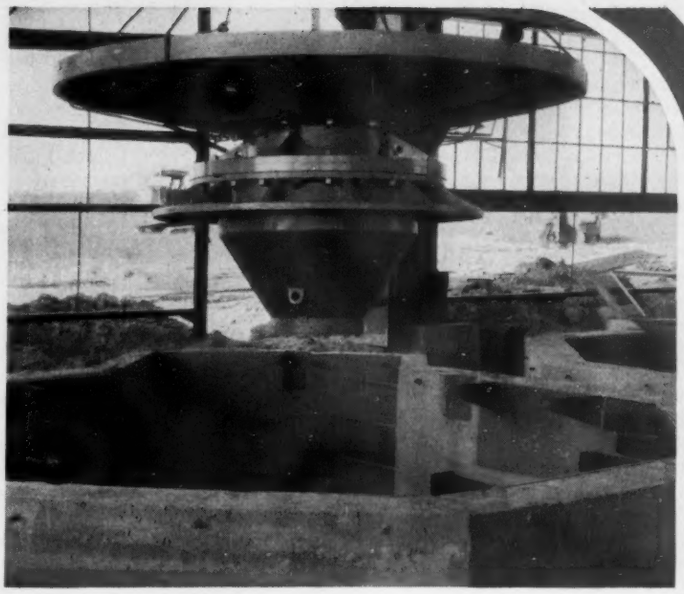
[15]O. Mohr: Abhandlungen auf dem Gebiet der technischen Mechanik; W. Ernst & Son, Berlin.

[16]E. Siebel and A. Pomp: Zur Weiterentwicklung des Druckversuchs; Mitt. K. W. Inst. Eisenforsch. 10 (1929) p. 55.

[17]A. Smekal: Die molekulartheoretischen Grundlagen der Festigkeitseigenschaften des Werkstoffkornes; Z. V. d. I., 72 (1928) p. 667.

[18]M. Ros and A. Eichinger: Versuche zur Klarung der Bruchgefahr. Eidg. Mat. Pr. Anst. a. d. Eidgen. Technischen Hochschule Zurich 1926.

[19]W. Lode: Versuch uber den Einfluss der mittleren Hauptspannung auf das Fliessen der Metalle; Z. angew. Math u. Mech., 5 (1926) p. 142.



THE eyes of the steel industry are turned toward this latest new development, the rotary casting process of the Rotary Electric Steel Company at Detroit. The principal parts of the equipment, including the rotary casting machines which were designed by the Detroit firm and are shown here, were built by United.

In accordance with the policy of the National Recovery Act, equipment builders, just as in other industries, will now be faced with the same basic costs when figuring your special equipment. This has placed an added emphasis on the reputation of the builder. His ability and his type of workmanship are now the prime considerations.

Years of experience in the engineering development and the construction of mill equipment recommends UNITED when new equipment is to be built. A recognized corp of engineers are at hand to help you when required, and shops with a reputation for the highest grade work are here to assure you the best possible product.

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is now in a preferred position to figure your

SPECIAL EQUIPMENT

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THE WORLD'S LARGEST MAKER OF ROLLS AND ROLLING MILL EQUIPMENT

the elastic work of deformation exceeds a certain limiting value, expresses the actual relations more satisfactorily in many cases than the previously described shear stress theory.

The greatest deviations in the deformation strength which are theoretically to be expected, from the values determined by the shear stress theory, amount to approximately 15 per cent. The deviations found experimentally by Lode are still less (maximum — 12 per cent). There is accordingly no objection to the use of the shear stress theory as a working hypothesis, as long as the fact is kept in mind that it is not rigorously valid. The relations which apply to the technical forming processes are given, by the use of the shear stress theory, in particularly simple form.

Method of Stress Involved

As the foregoing considerations show, the capacity for deformation and the deformation strength of a material are by no means independent values belonging to the material; but they are affected to a great extent by the method of stress during deformation. The method by which a certain deformation is carried out in practice is therefore by no means unimportant. Severe tensile stresses during forming lead to untimely fracture, even with very ductile materials, and especially with high deformation velocities, because the capacity for deformation is only slight under this condition of stress. Forming processes in which only tensile stresses occur are therefore extremely rare in practice.

On the other hand, the capacity for deformation becomes greater with increasing average pressure, and very great deformations can accordingly be produced under such stress relations. For instance, if a mild steel wire breaks at the point of necking after a reduction of area of about 60 per cent produced by a simple tensile stress, it is able to withstand without injury much greater deformations in drawing dies, because of the influence of transverse pressure exerted by the walls of the dies; but in order to keep the longitudinal tension small, the deformations must be distributed among a greater number of dies. Materials can be worked in the extrusion process, under pressure from all sides, which would fail in other forming processes even after relatively small deformations. Brittle stones, subjected to compressive stress from all sides, approach plastic behavior. These examples, which could be amplified at will, are sufficient to show the influence of the forming processes upon the deformability of materials.

When the capacity for deformation of a material is judged, as is frequently the case, by the elongation and reduction of area which have been determined in a tensile test, these values provide only a partial measure of the capacity for deformation of the material in question; because they are strictly valid only under determining external conditions which are the same as those in the tensile test. The elongation is determined essentially in the tensile test by a deformation under an unstable condition of loading, which is indicated by the stress-strain curve, and according to which the reduction of area is established. The reduction of area, on the other hand, is a measure of a deformation condition in which fracture occurs in the smallest cross-section of the necking bar, as a result of the complicated, multi-axed stress condition which exists there. This characteristic, however, is not perceptible in a compression test.

Very ductile materials can be formed by compression to any extent which may be desired in practice, without showing evidences of fracture; whereas proportionately smaller elongations in tensile tests of identical materials produce a reduction of area with consequent separation and fracture. It is therefore not permissible to judge the absolute capacity of a material for deformation, under any other method of stress, by the elongation values which have been determined in a tensile test. It appears possible, however, to study to a limited extent the relative behavior of various materials by comparison of the values of elongation and reduction of area.

(To Be Continued)

Bessemer Screw Steel Is Improved

AN IMPROVED bessemer screw steel involving mainly a radical improvement in its free-cutting quality has been announced by Jones & Laughlin Steel Corp., Pittsburgh. This steel is made in both S.A.E. 1112 and high-sulphur grades with chemical and physical properties unchanged from the steel which it supersedes.

From actual tests for performance observation, improvements in production ranging from 11 to 99 per cent are on record in the company's files. These are not laboratory tests but practical tests of commercial operation.

Machining time is reduced and tool life is extended, in some cases both, through the steel's improved cutting qualities, it is said. Furthermore, with less energy exerted through the tool, tearing action is minimized and, since there is less deformation of the metal, a finer finish is obtained.

Chemical Analysis Unchanged

In addition to there being no change in the chemical specification nor in the physical properties of the improved steel, the grain structure has not been altered in any manner nor has response to carburizing treatments been affected by the bettered machining quality, the maker claims.

To show conformity, the chemical specifications of the S.A.E. 1112, J. & L. Old Practice and J. & L. Improved Practice are identical as follows: Carbon, 0.08-0.16; manganese, 0.60-0.90; phosphorus, 0.09-0.13; sulphur, 0.10-0.18 per cent.

Representative tests on the improved practice bessemer steel indicate that physical strength has not been sacrified to obtain better machinability, as shown in the accompanying table. While the improved stock has just been offered to the trade, it has been in use for a number of months for the purposes of performance observation.

Physical Properties of Cold-Drawn Bessemer Screw Steel

Size	Tensile Strength, lbs. per sq. in.	Yield Point, lbs. per sq. in.	Elongation in 2 In., per cent	Reduction of Area, per cent	Brinell Hardness	Izod, ft.-lbs.
RANGE OF TEST RESULTS ON OLD PRACTICE						
	70,000-95,000	75% of tensile strength	14.0 min.	35.0 min.	155–212	8–16
REPRESENTATIVE TESTS ON IMPROVED PRACTICE						
¼″ Round	94,530	90,560	14.5	52.8	.....	....
½″ Round	92,930	85,340	18.5	47.7	180	9
¾″ Round	91,700	86,510	20.0	47.1	185	12
1″ Round	86,660	80,680	25.0	45.2	176	9
1¼″ Round	85,080	81,310	30.0	42.4	171	8

Folder Describes Many Uses Of Stainless Clad Steel

Typical applications of stainless-clad steel are illustrated and described in a 4-page folder recently issued by Ingersoll Steel & Disc Co., division of the Borg-Warner Corp., Chicago. Installation views are shown of tanks, pressure vessels, autoclaves, evaporators, yeast culture tanks, and numerous uses of stainless-clad steel for automobile trim, counter tops, cooking utensils and the like. Copies are available upon request to the company.

Heat Treatment Localizes Cold Heading Effects

PROBLEMS connected with the cold heading of steel and the manufacture of basic open-hearth steel for cold heading were made the subject for considerable discussion at one session of the American Society for Steel Treating which held its annual convention in Detroit, Oct. 2-6.

The subject was introduced by Carl L. Harvey, metallurgist, Lamson & Sessions Co., Kent, O., who presented a paper on the effect of cold working on the physical properties of cold-headed bolts. The purpose of the paper, said Mr. Harvey, was to describe in a general manner the effects of cold working of metals as it applies to the cold heading industry, and, more particularly, one method by which its effects may be used to advantage.

In many cases, stated Mr. Harvey, the limits of the cold heading process are the limits of malleability, beyond which material cannot be deformed without permanently impairing its physical properties. All cold-headed bolts are subjected to various amounts of cold work in the process of manufacture. In bolts of more than 0.30 per cent carbon or of alloy content, these cold working effects are removed completely by subsequent heat treatment.

Treatment Confined to Head

It was pointed out by the author that straight carbon steel bolts of less than 0.30 per cent carbon may be treated is such a way that the harmful effects of cold work in the headed section are removed without sacrificing physical properties produced in the shank by cold work. The details of the heat treatment then were explained by Mr. Harvey.

The speaker concluded by stating that such a process is commercially practical. It produces a bolt which is of excellent appearance, accurate as to thread size, has good physical values and is absolutely free from danger of head failures.

In discussing basic open-hearth steel for cold heading, A. B. Arganbright, superintendent of inspection and tests, Wheeling Steel Corp., Portsmouth, O., gave consideration to the material from ingot to wire. Only carbon steel, ranging from 0.08-0.40 per cent carbon and 0.25-0.80 per cent manganese came within the scope of the paper.

According to the author, an accurate record is kept of the ingots during rolling and they are subjected to numerous tests in order to judge their suitability for cold heading. Inspection continues through the various steps of rolling into blooms, billets and rods and a very careful examination made and the results noted before the rods are prepared for wire drawing.

Certain standard specifications have been adopted by the manufacturers covering three types of wire and these are followed accurately. In the bundling room the wire is tested finally for grade as ordered, physical properties and surface imperfections. A complete history of the steel is then available, which includes definite information on the manufacture and rolling processes and all routine tests.

Automatic Time Controls for Spot Welders Aid Production Economy

AUTOMATIC mechanisms for the control of time of current flow in spot welding operations were described and the advantages of different types contrasted at a technical session during the annual fall meeting of the American Welding society in Detroit, Oct. 4.

Two schools of thought govern the design of these control devices, one represented by devices in which the time of current flow is constant, the other by devices in which the timer sets automatically for varying conditions in the material to be welded. Enumerating advantages of the latter type, D. C. Wright, chief engineer, Electric Controller & Mfg. Co., Cleveland, pointed out that with automatic control of time with respect to current, bright cold-rolled steel or black hot-rolled steel can be welded with equal facility. Variations in thicknesses, either in gage or in number of pieces up to considerable limits, require no change in adjustments. Oxidation or burning of electrodes even to bad condition, is compensated for by allowing more time.

Governed by Current Flow

This type of timer employs in its construction a small current transformer, a simple double-wave rectifier tube, a condenser, an adjustable resistor, two neon glow tubes and two small relays. The dwell time of the welder contactor is proportional to the time taken to charge the condenser, the latter being inversely proportional to the voltage applied for charging, which is a direct function of the current flowing through the weld.

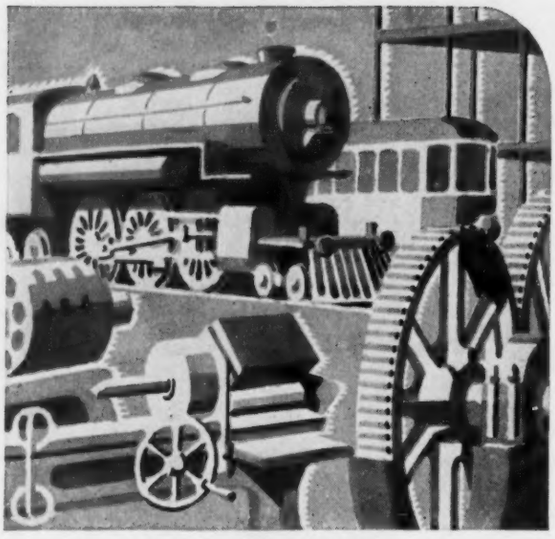
The constant-time type of control for spot welders was described by O. C. Frederick, General Electric Co., Schnectady, N. Y., who emphasized the need for accurate, automatic time control in spot welding of alloy steel as well as mild steel, to minimize warping of the metal and do away with any adverse effect on the metal surrounding the weld spot. Mr. Frederick reviewed work the General Electric Co. has done in development of synchronous time control for manually operated spot welders, thyratron control for high-speed resistance welding and other control devices.

Comments on the use of tube-controlled magnetic contactors in spot welding, both in the older and less difficult fields typified by welding periods of ¼-second or longer, and in the more recent and difficult developments involving the application of welding voltage for a period on the order of 1/20-second and less, were presented by Carroll Stansbury, engineering department, Cutler-Hammer Inc., Milwaukee. Several types of automatic timers of the constant-time variety were described by Mr. Stansbury with the aid of slides, and a method was outlined for checking the accuracy of timing by means of a device which counts the half cycles of current by causing each voltage peak to puncture a moving strip of treated paper.

Much Zinc Is Used On Automobiles

THE average automobile of today contains between 25 and 30 pounds of zinc in the form of die castings and rolled material—in certain cars this amount runs as high as 60 pounds. This statement was made at a roundtable discussion on the use of nonferrous metals in the automotive industry conducted by the Institute of Metals division of the American Institute of Mining and Metallurgical Engineers, meeting in Detroit, Oct. 4-5.

Zinc's place in the automotive field was discussed by W. M. Peirce, assistant to chief of research, New Jersey Zinc Co., Palmerton, Pa. Rolled zinc is used on instrument



LOCOMOTIVES AND LATHES

as well as # SUGAR AND SHOES

The great national recovery effort, centering at first upon stimulation of consumption goods, is now broadening to include products of a longer term of use, known generally as capital goods.

That such a step is essential to the success of the recovery program is evident. In 1929 consumption goods produced were valued at $30,000,000,000, while the value of durable goods (including automobiles) was $40,000,000,000.

At the low point of the depression consumption goods output dropped only 25 per cent below 1929, that of durable goods fell 65 per cent below 1929.

Normally purchases of machinery of all kinds exceed $5,000,000,000 annually, but were only about $1,000,000,000 in 1932.

Railroad purchases of supplies and equipment of all kinds normally are $4,500,000,000 each year. They were about $2,500,000,000 last year.

Building construction formerly averaged $8,000,000,000 annually, but is at the rate of $1,200,000,000 in 1933.

For many years the plants of the Interlake Iron Corporation have served the industries interested in the manufacture of capital goods, of which the country has a vast accumulated need.

INTERLAKE IRON CORPORATION

PIG IRON - COKE

PLANTS—CHICAGO . DULUTH . TOLEDO . ERIE

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panels, instrument dials, name plates, dome light rims, ash trays, and various forms of molding on the exterior. Drawn zinc finds use in cans for condensers, gaskets, scuff plates and more recently for headlight reflectors.

Die castings of zinc have a wider field of application, notably for radiator frames and molding, windshield sector arms, windshield stanchions, horn projectors, parts in vacuum clutches, and many others. Mr. Peirce cited numerous examples in which the use of zinc had effected substantial savings over the cost of parts made from other materials.

Outside the automotive field, Mr. Peirce mentioned the redesign of journal bearings through the use of die castings. A bearing now is being produced, he said, at a saving of 35 to 50 per cent in cost, this bearing being instantly interchangeable for a plain bushing or ball bearing. The bearing is made selfaligning through use of a spherical shell and bushing which are produced economically by die casting. The bushing is a die casting with a bronze tube insert as the bearing.

Other discussions, centering around the use of other nonferrous metals in the automotive industry, covered historical and present-day data on sleeve bearing design by E. R. Darby, Federal Mogul Corp., Detroit; application of bimetal alloys by R. G. Waltenberg, H. A. Wilson Co., Newark, N. J.; aluminum by E. H. Dix Jr., Aluminum Co. of America, New Kensington, Pa.; nickel by E. J. Hergenrother, International Nickel Co. Inc., Detroit; and copper and brass by W. G. Schneider, Copper & Brass Research association, New York.

Recent developments in the production and use of cemented carbide cutting tools were discussed in a paper prepared by Dr. Zay Jeffries, president, Carboloy Co. Inc., Detroit.

Methods and Equipment for Study of Metal Structures Are Improved

EFFORTS to probe the inner secrets of metal structures by use of high-power photomicrography have been given further impetus by the work of Francis F. Lucas, Bell Telephone Laboratories, New York, who is a nationally recognized authority on this subject. Speaking at the annual meeting of the American Society for Steel Treating in Detroit, Oct. 4, Dr. Lucas described a new precision high-power microscope for metallographic investigations, developed in the Bell laboratories under supervision of Dr. Lucas, and in co-operation with the Zeiss Co., Jena, Germany.

Summarizing desirable characteristics in precision equipment for photographing at magnifications from 4000 to 6000 diameters, Dr. Lucas emphasized the need for great mechanical stability, freedom from creep, absolute freedom from outside disturbances, the means to illuminate the specimen with light of any selected wave lengths within the visible spectrum and the highest order of achievement in optical equipment. A microscope and camera with these characteristics have been built and installed, and enough tests have been run during the last two years to appraise the excellence and limitations of the instruments.

Another method for examining metal structures internally, of more practical application, is the gamma-ray radiographic test which has made marked progress as a result of recent research. In contrasting gamma-ray radiographs with X-ray prints, a lack of contrast has occasionally been noted in the former, attributed to the very short wave lengths of gamma rays. Lack of contrast, of course, lessens the ability of the method to show up the smallest defects in the object examined. Here, then, was a problem—to study in detail the sensitivity of the gamma-ray method over a range of thicknesses of specimens.

Sensitivity Is Defined

This study was made by John T. Norton and Alfred Ziegler, associate professor and graduate student, respectively, department of mining and metallurgy, Massachusetts Institute of Technology, Cambridge, Mass. In order to arrive at some quantitative basis of measurement, the sensitivity of the gamma-ray method was defined as the change in thickness which is necessary to produce a 2 per cent change in film density under specified conditions. Sensitivity was studied experimentally by radiographing blocks of steel, of various thicknesses, using a capsule of radon as the source of gamma rays. Results showed that when the sensitivity is expressed in a percentage of the thickness of the object it has nearly constant value in the range from 2 to 6 inches, which is in the neighborhood of 1.3 per cent.

Research into the mechanism of crystal growth was reported by Wheeler P. Davey, research professor of physics and chemistry, Pennsylvania State college, State College, Pa. He discussed in systematic order the experimental evidence as to the growth of crystals from the vapor, from the melt and from the solid, and described physical conditions which are associated with each. Prof. Davey then built up a detailed theoretical picture of the growth of crystals. This picture was such that imperfections were seen to be inherent in the structure. The ordinary properties of materials, such as manner of crystal growth, tensile properties, segregation of impurities, properties of the melt, etch figures and segregate structures of the Widmanstatten type, all were seen to follow as natural corollaries to this picture.

Heat Treating in Gas Atmosphere

APPLICATION of atmosphere control to hump-type heat treating furnaces has been accomplished by equipment recently devised by the Leeds & Northrup Co., Philadelphia, the method being described completely in bulletin L-960, "The Vapocarb Hump Method for Hardening," recently published by the company. The equipment was displayed for the first time at the National Metal exposition in Detroit recently.

Over 1800 hump-type furnaces are now in use in over 800 plants in this country. With the development of auxiliary equipment for maintaining gaseous atmosphere in the furnace chamber, complete control is claimed to be offered over three vital elements in correct hardening: The quench point, rate of heating, and furnace atmosphere. Control of the latter of these effectively reduces scaling, pitting and decarburization of parts being hardened.

Atmosphere control centers around a separate device known as a cracking unit into which is fed a fluid hydrocarbon at a rate of 1 to 3 drops per second. With a constant temperature of between 1450 and 1500 degrees Fahr. developed in the cracking chamber, the fluid is broken down into a gas and passed through a connecting pipe into the gas-tight retort of the adjoining furnace. The gas maintains a slightly carburizing atmosphere in the heat treating furnace and passes out an exhaust port in the lid where it is ignited and burned. Automatic control equipment is provided to hold a constant temperature in the electrically heated cracking unit.

The bulletin cites savings possible with the "Vapocarb" method and lists complete prices for furnaces, cracking units, controllers and accessory supplies.

Making the Most of

METHODS AND MATERIALS

FIVE per cent chrome steel rapidly is replacing plain carbon steel in oil cracking stills. Higher working temperatures and pressures have made it possible to shorten the time of operation and raise the yield by astonishing percentages. Recent observations have shown that where plain carbon steel tubes in some cases have burned out in 300 hours, tubes containing 5 per cent chromium and 1 per cent tungsten have served 9200 hours in the same service, with the tubes still practically as good as new at the end of this period.

$ $ $

Risers on chrome-nickel steel castings, particularly of the 18-8 type, can be cut successfully using an injector-type cutting blowpipe. As considerable heat is necessary, it is recommended that one size larger nozzle be used than would be the case were the casting of plain steel. The nozzle preferably should have six preheating jets rather than the usual four or less. Oxygen hose should be ⅜-inch diameter to obtain ample volume. Oxygen pressure needs to be increased perhaps 15 to 20 per cent more than for an ordinary carbon steel casting. A skilled operator will sever a 6 x 6-inch riser in 3 to 3½ minutes cutting time which indicates that there is not a great deal of differenec in time between ordinary steel and chrome-nickel steel risers once a man has learned the practice.

$ $ $

PERHAPS the most important step in using rolled steel for machine construction is correct normalizing. Stresses are set up in the steel during rolling at the mill; then more stresses are introduced by welding during fabrication. For any accurate job that has to be machined, these stresses must be relieved. A temperature of 1200 degrees Fahr. should be maintained for 1 hour for every inch of thickness to be normalized. Tests have been made at various temperatures and it has been found that this formula removes the stresses and does not form excessive scale.

$ $ $

A nickel-chromium-molybdenum steel, suitable for bullet-proof vests, has been developed in Japan. Treated to give a tensile strength of 180,000 pounds per square inch or over, this material in sheet form 0.005 inch thick will flatten a bullet at average velocities on impact, and sheets as thin as 0.0035 inch will stop penetration sufficiently to protect human life.

$ $ $

Brick machine wear plates of alloy cast iron containing 2.00 per cent nickel and 0.75 per cent chromium have delivered 150,000 brick and still are in commission. With plain gray iron, 50,000 brick was the maximum.

$ $ $

REAMING a 0.40-0.50 per cent carbon steel often is quite difficult, even in the quenched and drawn condition, because of tearing. The

addition of 0.50 per cent molybdenum to such a steel so successfully eliminates this trouble that a well-known steel distributor has added it to its standard brands.

$ $ $

A cast iron with a martensitic structure in the cast or heat treated state is said to be well suited for crankshaft production. Such an iron requires a low total carbon of 2.25 to 2.50 per cent, low silicon of 1.00 to 1.50 per cent, nickel 3 to 4 per cent, and probably molybdenum or chromium. These crankshafts have a high hardness and are unmachinable as cast. They are annealed to produce a brinell hardness number of 300 to 320 where they are machinable and possess good strength and toughness. The high hardness of the bearings insures excellent wearing properties.

$ $ $

One of the most useful and profitable fields for the use of hard chromium plating has proved to be that of a "putting on" tool in the salvaging of overground parts. Millions of dollars worth of jig, tool and die parts have been saved in the automotive industry alone in the past five years. Often pieces worth several hundred dollars can be salvaged at a cost of three or four dollars.

$ $ $

THE selection of heavy oils for roller bearing lubrication should be carried out with the utmost care by careful observation of bearing temperatures, for it is possible to overestimate the conditions of operation, with the result that an excess of internal friction may be developed.

$ $ $

Operating on caustic solutions in a midwestern oil refinery, a nickel-chrome cast-iron centrifugal pump has provided more than 18 months of satisfactory service. A pump of ordinary cast iron used previously required replacement about every three months.

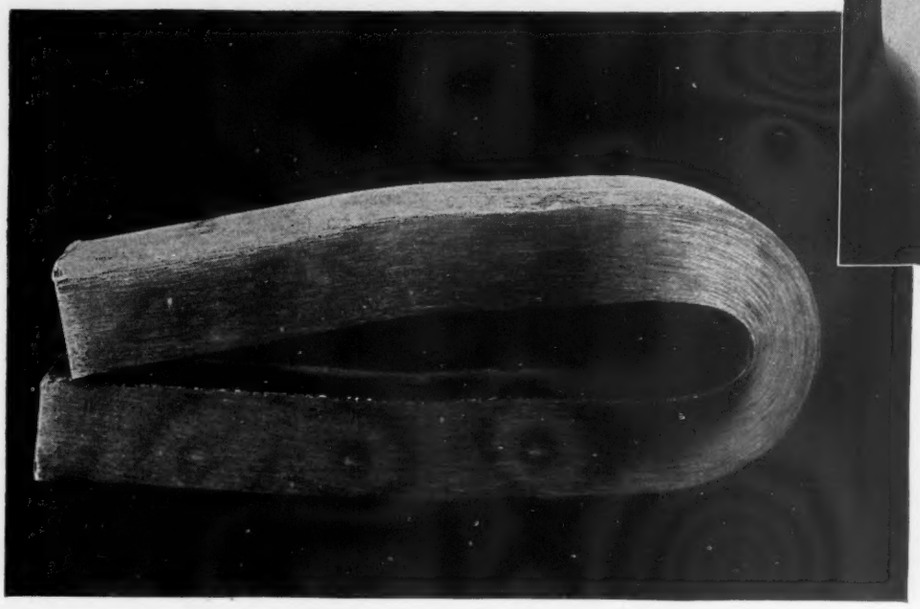
$ $ $

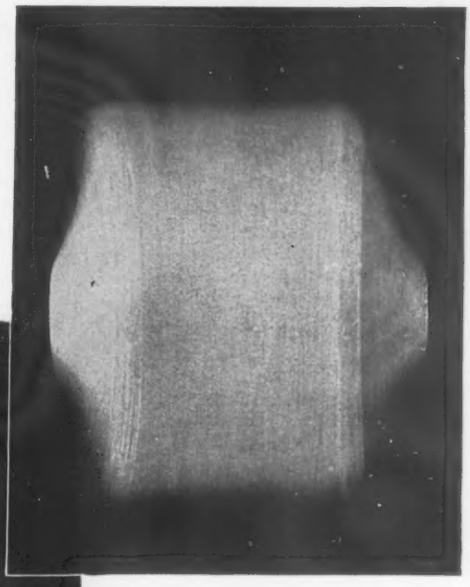
An eastern railroad recently checked up on several hundred angle iron cross bars which are scrapped yearly, due mostly to small cracks. Arrangements were made to weld up about 100 of them by oxyacetylene welding and to test them out for serviceability. If the operation is successful, this process of reclamation will be adopted at other points on the road.

$ $ $

Steel guide blocks which were used in machines manufacturing lock washers were subjected to such severe abrasion that they had a life of from 9 to 18 hours only. These block cost $2.50 each and about 45 minutes was required to replace them. Blocks of tungsten carbide were installed and at last report had 250 hours to their credit without appreciable wear. During this period the savings amounted to $41.70 after making allowance for the higher cost of the tungsten carbide.

Here is an Alloy Steel you can sell **AS-ROLLED–** CROMANSIL





End View of Cold-Bent Plate

Note high ductility with complete freedom from cracking in this as-rolled Cromansil plate.

Cold Bend of Cromansil Plate

This one-inch boiler-plate grade of Cromansil steel in as-rolled condition was cold-bent flat on itself with 80 per cent elongation on the outside of the bend and with no fracture.

■ As-rolled or normalized Cromansil (a chromium-manganese-silicon alloy) can be cold-bent more than 180 deg. around a pin whose diameter is 1-1/4 times plate thickness. These are its physicals:

Carbon	0.20 per cent.
Plate thickness	3/4 in.
Proportional Limit (psi)	47,500 lb. per sq. in.
Yield Point (psi)	61,800 lb. per sq. in.
Ultimate Strength (psi)	95,000 lb. per sq. in.
Elongation in 8 in.	22 per cent.

In its as-rolled condition, Cromansil can be welded without air-hardening; and tests at Lehigh University have proved its excellence for riveting. ■ Any open-hearth operator can produce Cromansil steel without departing from usual metallurgical procedure. Its higher cost is justified by its higher physical properties which make it suitable for saving weight in seamless tubing, ship plate, castings, structural shapes, tanks, cars, pen-stocks, staybolts, pressure and process equipment, pipe, and machine parts. Our new booklet, "Cromansil Steels," gives the complete story. Send for it now.

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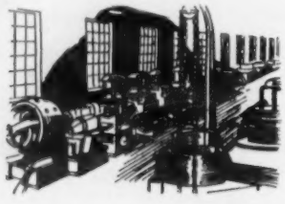
PROGRESS IN STEELMAKING

AN ECONOMY of 180 kilowatt hours per ton over a 4-month period is afforded by annealing 5-ton charges of high-carbon strip in electrically-heated, bell-type furnaces. The time required to bring the steel to 1320 degrees Fahr. is about 15 hours and for cooling in the furnace about 3 hours.



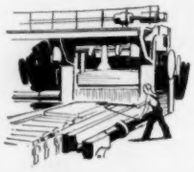
ALL necessary operations involved in the cutting and polishing of cemented-carbide wire-drawing dies now are performed by a single machine. The new unit will make a finished die from an incased rough nib thus replacing two or three machines and a hand polishing operation.

♦ ♦ ♦

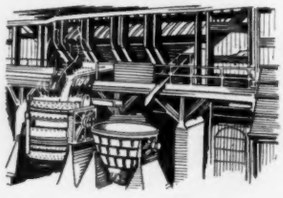
Development of a carbon silicon-carbide thermocouple now permits temperatures up to 3275 degrees Fahr. to be determined. The couple is made by running a silicon-carbide rod lengthwise through a carbon tube, which is closed and rounded at one end, and then tightly fitting the silicon-carbide rod into a pocket on the interior of this closed end. A decided advantage of the carbon silicon-carbide couple is its reproducibility. Temperatures of various liquid steel baths have been determined with this type couple which was immersed in the baths for long periods of time during each series of measurements; the calibration of the couple was not affected by the high temperatures. Two 8-foot couples have been made and calibrated for steel plant usage and interesting data have been obtained. Temperatures of molten iron in the runner and of open-hearth steel during the tap have been measured. Highly satisfactory results have been secured in measuring the temperature of open-hearth heats while still in the furnace. Temperature control in this connection is contemplated in tapping each grade of steel at a predetermined temperature interval above its melting point.

♦ ♦ ♦

Further developments and refinement have been made in the design of the photoelectric recorder. By means of an optical system and an electron-tube circuit, a high-torque recording element is actuated so that it follows the basic instrument or a galvanometer and records it readings. Continuous gaging of strip thicknesses and wire diameters are some of the applications of this recently improved device.



REFINEMENT in the production of quality steel plates has been effected by a producer in the East by the installation of a continuous heat treating furnace between the mill and straightening rolls. In finishing light-gage plates at low temperatures, physical properties are affected, resulting in a reduction of ductility and an increase in hardness and tensile strength. By passing the plates through the new furnace however, the steel is brought up to the proper temperature to relieve all cold working stresses. To insure a uniform distribution of heat through the furnace, two propeller type alloy steel fans are located under the arch about 17 feet from each end. By controlling the temperature and speed of travel, a definite schedule is set up for the proper heat treatment of the various gages and grades of plates produced. This arrangement also insures uniform physical qualities and flatness.



INSULATING steelworks ladles promotes the formation of thin skulls, according to the practice at an Ohio open-hearth shop. Insulation used for this purpose usually is in the form of a cement. Thinner linings are used when ladles are insulated.

♦ ♦ ♦

Chrome plating mandrels and dies used for cold drawing tubes to the desired specification affords increased life of these parts as well as economy in the drawing operation and a high quality of finish.

♦ ♦ ♦

Impinging force necessary to promote efficiency in the descaling of steel varies from 5 to 10 pounds per lineal inch of the width of slab according to the degree of cleansing desired. About 6½ gallons of water a minute at 500 pounds pressure is required for a value of 7½ pounds per inch of slab width.

♦ ♦ ♦

No battery or other source of voltage is required for operating a newly introduced photoelectric cell for use with current indicating meters for light intensity measurements, or with sensitive electromagnet relays without vacuum tube amplification. The sensitive element is a disk hermetically sealed into a metal case.

NEW EQUIPMENT

PRODUCTION FABRICATION
TREATMENT FINISHING

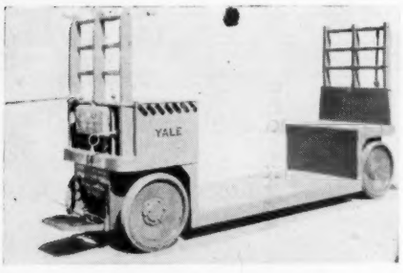
Markets Lapping Wheels for Cemented Carbide Tools

Thomas Prosser & Son, 15 Gold street, New York, now represents A. C. Wickman Ltd., England, for Spedia lapping wheels and hand laps for Widia and other cemented carbide cutting tools. Wheels are stocked in cup form in the standard size, 3 inches diameter, ⅞ inch deep, ½-inch hole, and ⅜-inch rim. They should be run at approximately 6000 surface feet per minute. A fine finish on the cutting edge of the tool is produced.

◆

Electric Truck Is Built For Safe Operation

Yale & Towne Mfg. Co., Philadelphia division, has developed an electric truck, shown herewith, in the design of which safety has been the keynote. Double end control is provided with a standard interlocking type controller with four speeds in either direction. The controller is



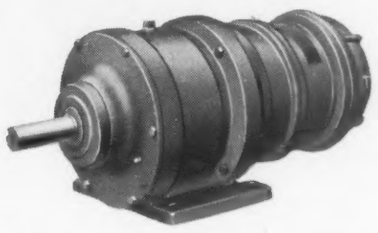
Yale & Towne electric truck has electric welded frame, spur gear drive

interlocked with the brake pedal in such a way that it must be in neutral position with the brake released before driving power is obtained. A one-piece spring folding operator's platform is installed at each end of the vehicle.

◆

New Motor Reducers Cover Wide Range of Ratios

Davis & Thompson Co., 6619 West Mitchell street, Milwaukee, recently, brought out a complete line of motor reducers. Type A unit is made in ratios 3:1 to 7:1, reduction being made through planetary gears. Sizes up to 3 horsepower are made without feet on the housing, while those above that capacity have feet. Type



Davis & Thompson type D high reduction speed reducer

B is available in ratios from 8:1 to 24:1. Type C is designed with ratios ranging from 1:11 to 1:5. Type D, shown herewith, is called the high reduction reducer, ratios from 25:1 to 600:1 being standard in this model. All units are built to use a standard NEMA motor without change.

◆

Optical Gear Tester Embodies Unique Design Features

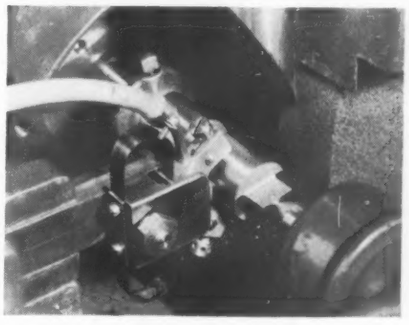
R. Y. Ferner Co., Washington, as American agents for Societe Genevoise d'Instruments de Physique, Geneva, Switzerland, is marketing a new optical gear tester which measures pitch and eccentricity of small gears. This instrument, shown herewith, is said to differ from most projection instruments in that it does not project an image of teeth of the gear, but throws on a graduated screen a rectangular shadow of a signal plate by which, on the horizontal ordinate of the screen is read the variations in eccentricity of the gears and on the vertical ordinate the errors of pitch. Gears to be tested are mounted on mandrels between adjustable centers.

Optional gear tester recently placed on the market by R. Y. Ferner Co.

New Air Sizing Device Has Universal Application

Landis Tool Co., Waynesboro, Pa., is marketing a new air-sizing device which is universal in application inasmuch as it may be used for both external and internal grinding operations of all kinds. The accompanying illustration shows a typical external grinding sizing head.

Operation of the device is based on the principle that if air is escaping from a pressure line the pressure in this line is affected by the size and shape of outlet through which it is escaping. This change in pressure is used to change the level of the mercury in a U-tube to close contacts and constitutes a mercury switch which controls feeds and other machine movements. Setting up of the



External grinding air-sizing head developed by Landis Tool Co.

device requires but a short time. All necessary re-adjustments are provided for. Air pressure of from 2 to 20 pounds per square inch is used. Any shop air line may serve as the source for this pressure as two valves reduce it to the desired amount.

◆

Offers a New Line of Stub Screw Machine Reamers

Pratt & Whitney Co., Hartford, Conn., has placed on the market a new line of stub screw machine reamers designed primarily for automatic screw machine work and for reaming jobs requiring short tools. These new tools provide the decimal sizes necessary in accurate production work where close fitting is needed. Decimal sizes are obtained by carrying reamers in stock as standard blanks which are fluted, hardened and shank ground. Reamers are carried in stock in 15 sizes of blanks.

New SAFETY »» *New* ECONOMY

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ATTACHED QUICKLY IN THE FIELD
FIEGE TIGER-CLAW WIRE ROPE SOCKETS
No Zinc, Babbitt nor Lead
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Look for Federal Aid To Bolster Steel Rate

Operations Down 6 Points to 34 Per Cent, Automotive Industry Slows—Rail Concession of $2 a Ton Offered Government—Works Program Maturing

WITH steelworks operations down 6 points to 34 per cent, apparently headed lower this week, and resumption of automotive buying on a large scale not in prospect for another month, the industry is looking more to government support for a rally.

Rail mills are understood to be submitting a price of $38, a concession of $2 a ton, for the 844,000 tons which Co-ordinator Eastman has assembled for distribution. Public works projects also are maturing more rapidly, and are regarded as another source of demand which may apply the brakes to diminishing output.

The combination of labor troubles in the automotive industry, retarding new models, and the heavy stocking of material prior to Oct. 15 temporarily has closed that outlet for steel. Sheet mills recently working to capacity to complete low-price third quarter contracts for the industry now are down to an average of one-third their former rate.

Railroad buying is at the lowest point of the year, both as regards new material and equipment, a fact which leads some equipment builders to anticipate substantial purchases before the close of the year. Norfolk & Western, on whose inquiry for 10,000 tons of rails producers bid $40 a ton, is understood to be awaiting the government's action.

Government Financing Is Expedited; Steel Price Trend Continues Upward

Government loans for public projects are being expedited, and though delays are being encountered between the time states and municipalities award contracts and when approval is given at Washington, heavy steel tonnages are accumulating for placing with the mills shortly.

Structural shape awards for the week, 6332 tons, reflect the slowness in the final purchasing of steel. Bookings for September, as reported by the American Institute of Steel Construction Inc., were 30 per cent under the August total. A substantial tonnage is required for a government airport development at Middletown, Pa., while Kansas City, Mo., is taking bids on 5000 tons for an auditorium.

In other current government work, about 6000 tons of steel is being provided for coast guard vessels, and 8200 tons is due for award next month for two cruisers.

An $8,000,000 federal loan for sanitation work at Chicago releases a large tonnage of pipe, producers agreeing to furnish the material at prices they bid several months ago, with additional compensation to be determined later. Cast pipe makers are competing for 25,000 tons for Mexico City and 12,000 tons for Porto Rico. Providence, R. I., has placed 6000 tons.

Higher prices so far have meant little to the steel industry, as consumers generally are covered for the fourth quarter at the lower figures prevailing late last month, and new orders are negligible. Nevertheless, the trend of the market continues upward. Discounts on bolts, nuts and rivets have been reduced. Sheet piling is up $2 a ton. Warehouse prices, under the new basing system, are $3 to $10 a ton higher. Another increase of $3 a ton on steel bars is being considered, and tin plate makers are contemplating new schedules.

Scrap Weak, Affects Pig Iron Consumption; Further Code Regulations Being Prepared

In sharp contrast to this movement, scrap prices are easier, a fact which is contributing to the slack demand for pig iron, heavy breakable cast scrap being available in the Pittsburgh market at $11.50, compared with $18 for pig iron. Domestic furnace interests are being permitted to offer concessions to pipe producers bidding for export orders.

Further revisions of the steel code are being considered as the close of the 90-day trial period, Nov. 19, approaches. Many additional supplementary regulations are being prepared.

In practically all districts steelworks operations declined during the past week. In Cleveland the rate was down 13 points to 33 per cent; New England 13, to 82; Youngstown 6, to 51; Pittsburgh 5, to 35; Buffalo 5, to 24; Chicago 4, to 45; eastern Pennsylvania 3, to 23½. In the Wheeling district operations advanced 2 points to 47 per cent; Detroit remained at 55 per cent, and Birmingham at 30.

Tin plate mill operations in the Pittsburgh district were up 10 points to 95 per cent, on heavier specifications from canmakers.

STEEL's iron and steel composite is unchanged at $31.59, and the finished steel composite remains $49.20; while the scrap index is down 17 cents to $10.29.

COMPOSITE MARKET AVERAGES

	Oct. 21	Oct. 14	One Month Ago Sept., 1933	Three Months Ago July, 1933	One Year Ago Oct., 1932	Ten Years Ago Oct., 1923
Iron and Steel Composite	$31.59	$31.59	$31.30	$29.81	$29.32	$43.84
Finished Steel Composite	49.20	49.20	48.52	47.20	47.64	67.77
Steelworks Scrap Composite	10.29	10.46	10.83	10.66	6.96	14.25

Iron and Steel Composite:—Pig iron, billets, slabs, sheet bars, wire rods, tin plate, nails, sheets, plates, shapes, bars, and black pipe. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

	Oct. 21, 1933	Sept. 1933	July 1933	Oct. 1932
Finished Material				
Steel bars, Pittsburgh	1.75	1.60	1.60	1.60
Steel bars, Chicago	1.80	1.65	1.70	1.70
Steel bars, Philadelphia	2.04	1.91	1.91	1.91
Iron bars, Chicago	1.60	1.60	1.65	1.65
Shapes, Pittsburgh	1.70	1.60	1.60	1.60
Shapes, Philadelphia	1.90	1.81½	1.65	1.75
Shapes, Chicago	1.75	1.65	1.70	1.70
Tank plates, Pittsburgh	1.70	1.60	1.60	1.60
Tank plates, Philadelphia	1.88	1.79½	1.49½	1.79½
Tank plates, Chicago	1.75	1.65	1.70	1.70
Sheets, No. 10, blue anneal., Pitts.	1.75	1.70	1.75	1.70
Sheets, No. 24, hot ann., Pitts.	2.25	2.25	2.25	2.10
Sheets, No. 24, galvan., Pitts.	2.85	2.85	2.85	2.80
Sheets, No. 10, blue anneal., Gary	2.00	1.90	1.90	1.80
Sheets, No. 24, hot ann., Gary	2.35	2.35	2.35	2.20
Sheets, No. 24, galvan., Gary	2.95	2.95	2.95	2.85
Plain wire, Pittsburgh	2.10	2.10	2.10	2.20
Wire nails, Pittsburgh	2.10	2.10	2.05	1.95
Tin plate, per base box, Pitts.	4.65	4.65	4.25	4.75
Semifinished Material				
Sheet bars, open-hearth, Youngs.	26.00	26.00	26.00	26.00
Sheet bars, open-hearth, Pitts.	26.00	26.00	26.00	26.00
Billets, open-hearth, Pittsburgh	26.00	26.00	26.00	26.00
Wire rods, Pittsburgh	35.00	35.00	35.00	37.00

	Oct. 21, 1933	Sept. 1933	July 1933	Oct. 1932
Pig Iron				
Bessemer, del. Pittsburgh	19.26	19.26	17.86	15.76
Basic, valley	17.00	17.00	15.60	14.00
Basic, eastern, del. eastern Pa.	17.76	17.76	16.79	13.60
No. 2 foundry, del. Pittsburgh	18.76	18.76	17.36	15.76
No. 2 foundry, Chicago	17.50	17.50	16.75	15.50
Southern No. 2, Birmingham	13.50	13.50	12.60	11.00
No. 2X, Eastern, del. Phila.	18.63	18.63	17.28	14.01
Malleable, valley	17.50	17.50	16.10	14.50
Malleable, Chicago	17.50	17.50	16.75	15.50
Lake Superior charcoal, del. Chi.	23.54	23.54	23.04	23.04
Gray forge, del. Pittsburgh	18.38	18.26	16.93	15.63
Ferromanganese, del. Pittsburgh	87.24	87.24	84.44	73.24
Scrap				
Heavy melting steel, Pittsburgh	$12.25	13.00	12.70	9.50
Heavy melting steel, eastern Pa.	10.00	10.70	12.00	7.25
Heavy melting steel, Chicago	9.25	10.00	10.45	6.00
No. 1 wrought, eastern Pa.	10.50	11.60	13.00	7.25
No. 1 wrought, Chicago	9.25	9.25	10.20	5.60
Rails for rolling, Chicago	11.00	11.25	11.15	8.00
Coke				
Connellsville, furnace, ovens	3.75	2.50	2.40	2.00
Connellsville, foundry, ovens	4.25	3.15	2.85	2.75

Steel, Iron, Raw Material and Metals Prices

Prices conform to American Iron and Steel institute schedules. Asterisk denotes price change this week

Sheet Steel

HOT ROLLED No. 10
(24 to 48 inches wide)

Pittsburgh, base	1.75c
Gary, base	1.85c
Chicago, del.	1.88½c
New York, del.	2.08c
Phila., del.	2.04c
Birm., base	1.90c
St. Louis, del.	2.07c

HOT ROLLED ANN. No. 10

Pittsburgh, base	1.90c
Gary, base	2.00c
Chicago, del.	2.03½c
Phila., del.	2.19c
New York, del.	2.23c
St. Louis, del.	1.97c
Birm., base	2.05c
F.o.b. cars, dock Pacific ports	2.42½c

HOT ROLLED ANN. No. 24

Pittsburgh, base	2.25c
Gary, base	2.35c
Chicago, del.	2.38½c
New York, del.	2.58c
Phila., del.	2.54c
Birm., base	2.40c
St. Louis, del.	2.57c
F.o.b. cars, dock, Pacific ports	2.95c

GALVANIZED No. 24

Pittsburgh, base	2.85c
Gary, base	2.95c
Chicago, del.	2.98½c
Phila., del.	3.14c
New York, del.	3.18c
Birm., base	3.00c
St. Louis, del.	3.17c
San Fran., f.o.b. cars, dock	3.55c

TIN MILL BLACK No. 28

Pittsburgh, base	2.50c
Gary, base	2.60c
St. Louis, del.	2.82c

COLD ROLLED No. 10

Pittsburgh, base	2.30c
Gary, base	2.40c
Philadelphia, del.	2.59c
New York, del.	2.63c

COLD ROLLED No. 20

Pittsburgh, base	2.75c
Gary, base	2.85c
Philadelphia, del.	3.04c
New York, del.	3.08c

ENAMELING SHEETS

Pitts., No. 10	2.45c
Pitts., No. 20	2.90c

Tin and Terne Plate

Per 100-lb. box, Pittsburgh Gary base, 10 cents higher.

Tin plate, coke base, contract	$4.65
Do., stock	4.05
Long ternes, No. 24 unassorted	2.90c

Corrosion and Heat Resistant Alloys

Base, Pittsburgh

18% chrome, 8% nickel sheets, 35c; plates, 31c; bars, 28c.

	A	B	C	D
Bars	17c	18.5c	21c	26c
Plates	20c	21.5c	24c	29c
Sheets	25c	28c	31c	35c
Hot Strip	17c	18.5c	21c	26c
Cold Strip	22.5c	24c	27c	35c

Carbon 0.12 and under; no nickel. A has chrome 15% and under. B over 15/18% inc., C over 18/23% inc., D over 23/30%.

Steel Plates

Pittsburgh, base	1.70c
New York, del.	1.98c
Phila., del.	1.88½c
Boston, del.	2.10c
Buffalo, del.	1.93½c
Chicago, base	1.75c
Cleveland, del.	1.88½c
Birm., base	1.85c
Coatesville, base	1.80c
Sparrows Pt., base	1.80c
Pac. Coast, f.o.b. St. Louis, del.	1.97c
cars, dock	2.25c

Structural Shapes

Pittsburgh, base	1.70c
Philadelphia, del.	1.90½c
New York, del.	1.95½c
Boston, del.	2.08½c
Bethlehem, base	1.80c
Chicago, base	1.75c
Cleveland, del.	1.88½c
Buffalo, base	1.80c
Birm., base	1.85c
Pac. Coast, f.o.b. cars, dock	2.25c

Bars

SOFT STEEL

Pittsburgh, base	1.75c
Chicago, base	1.80c
Birm., base	1.90c
Buffalo, base	1.85c
Pac. Coast ports, cars, dock, c.i.f.	2.30c
Cleveland, base	1.80c
Philadelphia, del.	2.04c
Boston, del.	2.19c
New York, del.	2.08c
*Pitts., forg. qual.	1.75c-2.25c

RAIL STEEL
To Manufacturing Trade

Pittsburgh	1.65c
Chicago	1.70c
Cleveland	1.70c
Gary, Ind.	1.70c
Buffalo	1.75c

IRON

Chicago, base	1.60c
Philadelphia, base	1.74c
Pitts., refined	2.75c-7.50c

REINFORCING
New billet

Pittsburgh, cut lengths	1.90c
Chicago, Buffalo, Cleveland, Birm., Young.	1.95c
Gulf ports	2.20c
Pacific coast ports	2.35c
Phila., del.	2.19c

Rail steel

Pittsburgh, base	1.75c
Chicago, Buffalo, Cleveland, Gary, Young	1.80c
Gulf ports	2.15c
Pacific coast ports	2.30c

Wire Products □ □

(Prices on carloads. Mixed carloads up 10c; joint carloads up 20c; less carloads up 30c. 10% dis. on nail extras on straight or mixed carloads to one consignee.)

Base, Pittsburgh-Cleveland
(Per 100-lb. keg)

Standard wire nails	$2.10
Cement coated nails	2.10
Galvanized nails	3.60

(Per pound)

Polished staples	2.80c
Galvanized fence staples	3.05c
Barbed wire, gal.	2.60c
Annealed fence wire	2.25c
Galvanized fence wire	2.60c
Woven wire fencing (base column, c.l.)	$55.00
Plain wire, 6-9 gage to mfg. trade	2.10c

Anderson, Ind., Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire	3.10c

Chicago and Waukegan $1 higher, Worcester $2 higher.

Cold-Finished Bars □

Base Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs.	1.95c
20,000 to 59,999 lbs.	1.90c
60,000 to 99,999 lbs.	1.85c
100,000 lbs. and over	1.82½c

Chicago, Cleveland, Buffalo up 5c; Detroit up 20c; eastern Michigan up 25c.

Shafting □ □ □

Turned and ground, Pitts. base	
1⅛-inch	3.25c
1 7/16 to 1½-inch	2.75c
1 9/16 to 1 7/8-inch	2.60c
1 11/16 to 2⅞-inch	2.45c
2 1/16 to 6-inch	2.30c

Alloy Steel □ □

Hot rolled, f.o.b. Pittsburgh, Buffalo, Chicago and Massillon, O., 2.45c. F.o.b. Bethlehem, Pa., 2.55c.

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20

4100 .15 to .25 Mo.	0.50
4600 .20 to .30 Mo. 1.25-1.75 Ni.	1.05
5100 .80-1.10 Cr.	0.45
5100 Cr. spring	base
6100 bars	1.20
6100 spring	0.70
Cr., Ni., Van.	1.50
Carbon van.	0.95
9250 carbon base plus extras	

Strip and Hoops □

Hot-rolled strip up to 23 1/2-in wide, Pitts.	1.75c
Do., Chicago	1.85c
Do., del. Phila.	2.04c
Do., del. N. Y.	2.08c
Cooperage hoop, Pittsburgh	1.85c
Do., Chicago	1.95c
Cold-rolled strip, Pitts., Cleve.	2.40c
Worcester, 3 tons or over	2.60c

Rails, Track Material □

(Gross Ton)

Stand. rails, mill	$40.00
Relay rails, Pitts.	
20-45 lbs.	$24.50
50-75 lbs.	$20.00
80-100 lbs.	$23.50
Light rails, billet qual., Pitts., Chi., gross ton	$32.00
Do., reroll. qual.	$31.00
Angle bars, mills	2.55c
Spikes, R. R., Pitts.	2.40c
Track bolts, base	3.40c
Tie bolts, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $5; 16 and 20 lbs. up $1; 12 lbs., up $2; 8 and 10 lbs. up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons or more; diff. for less.

Bolts and Nuts □ □

Pittsburgh, Cleveland, Birmingham, Chi. Discounts to legitimate jobbing or large consuming trade for full case lots, Dec. 1, 1932, lists.

CARRIAGE BOLTS

*All sizes, cut thread	70 off
*Rolled thread, ½ x 6 and smaller	70 off

MACHINE BOLTS

*All sizes, cut thread, lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts without nuts	70 off
Tire bolts	60 off
Stove bolts, 72½-25-10 off in pkgs.; 85 off in bulk, 5000 or more of a size.	
*Rolled thread machine bolts, ½ x 6 and smaller,	66 off
*Step bolts	66 off
*Elevator bolts	66 off

NUTS

Semifinished	70 off

HEXAGON CAP SCREWS

Milled	85 off
Upset 1-in., smaller	85-10 off

SQUARE HEAD SET SCREWS

Upset, 1-in., smaller	80 off
Upset, larger than 1-in.	80 off
Headless set screws	75-10 off

Rivets, Wrought Washers

*Struc., c.l., Pitts. Cleve.	2.75c
*Struc., c.l., Chi.	2.85c
*7/16-in. & smaller, Pitts., Chi., Cleve.	70 and 10 off
Wrought washers, mill	6.00 off

Cut Nails, Piling □

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more; no discount on size extras	$3.00
Do., less than 5 kegs; no discount on size extras	$3.15
Steel piling, Pitts.	1.90c
Steel piling, Chi., Buff.	2.00c

Pipe and Tubing

Base $200 net ton, except on standard comercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Gary, Ind., Lorain, O., to consumers in carloads. Indiana Harbor, Ind., and Evanston, Ill., 2 points less. Chicago delivered, 2½ points less. Wrought pipe, Pittsburgh base.

BUTT WELD

In.	Blk.	Gal.
Steel		
¼ and ⅜	57	38½
½	62	50½
¾	65½	55½
1—3	67½	58½
Iron		
½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

LAP WELD

Steel		
2	63½	54½
2½—3	66½	57½
3½—6	68½	59½
7 and 8	67½	57½
9 and 10	67	57
Iron		
2	37	22½
2½—3½	38	25
4—8	40	28½
9—12	38	24½

LINE PIPE

Steel	
⅛-inch, butt weld	50½
¼—⅜, butt weld	56
½, butt weld	61
¾, butt weld	64½
1—3, butt weld	66½
2-inch, lap weld	62½
2½—3, lap weld	65½
3½—6, lap weld	67½
7—8, lap weld	66½
Iron	

⅛—1½ inch, black and galv. take 4 pts. over; 2½—6 inch 2 pts. over discounts for same sizes, standard pipe list. 8—12 inch no extra.

BOILER TUBES

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		Charcoal Iron	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3¾	50	3	17
4	52	3¾—3½	18
4½—6	42	4	20
1½	1	4½	21

On lots of a carload or more, above discounts subject to preferential of two 5% discounts on steel and 10% on charcoal iron.

Lapwelded steel: Under 10,000 lbs., 6 pts. under base and one 5%; on 10,000 lbs. to carload, 4 pts. under base and two 5%. Quantity discounts same as for hot-rolled. Charcoal iron: Under 10,000 lbs., 2 pts. under base; on 10,000 lbs. to carload, base and one 5%.

SEAMLESS BOILER TUBES

Cold Drawn			
2—2¼	27	3¼—3½	44
2½—2¾	34	4	46
3	41	4½, 5, 6	46

(On 1—1¾-inch sizes mechanical tubing dis. apply.)

Hot Rolled			
2—2¼	33	3¼—3½	50
2½—2¾	40	4	52
3	47	4½, 5, 6	42

Quantity discounts: Under 10,000 lbs., 10 pts. and 5%; 10,000 to 24,999 lbs., 6 pts. and 5%; 25,000 lbs. to carload, 2 pts. and 5 and 5%; carload and over, base discount and 5 and 5%. No extra for lengths 24 ft. and under.

Seamless Tubing □

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe □

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$35.00-36.00
4-in., Birm.	38.00-39.00
4-in., Chicago	46.00-47.00
6 to 24-in., Chicago	43.00-44.00
6-in. & over, N. Y.	34.50-36.50
4-in., New York	36.50-38.50

Class A pipe $3 over Class B.

Stand. fitgs., Birm, base	$90.00

Six to 24-inch, fittings, base; over 24-inch plus $20; 4-inch, plus $10; 3-inch, plus $20; gas pipe fittings, $5 higher.

Nonferrous Mill Products

F.o.b. mill base, cents per lb., except as specified. Copper, brass products based on 9.00c, Conn., copper

Sheets

Yellow brass (high)	14.75
Copper, hot rolled	17.12½
Lead, cut to jobbers	7.75
Zinc, 100-lb. base	9.00

Tubes and Pipes

High yellow brass	16.37½
Seamless copper	16.62½

Rods

High yellow brass	12.25
Copper	13.87½

Anodes

Copper, untrimmed	14.50

Wire

Yellow brass (high)	14.75

Old Metals □ □

Deal. buying prices, cents lb.

No. 1 Composition Red Brass

New York	4.00- 4.50
Chicago	3.75- 4.00
Cleveland	3.75- 4.25
St. Louis	4.50- 4.75

Heavy Copper and Wire

New York	5.25- 5.75
Chicago, No. 1	5.25- 5.75
Cleveland	4.50- 5.00
St. Louis	5.25

Composition Brass Borings

New York	3.75- 4.00

Light Copper

New York	4.75- 5.00
Chicago	4.00- 4.50
Cleveland	4.00- 4.50
St. Louis	5.00

Light Brass

Chicago	2.25- 2.50
Cleveland	2.25- 2.50

Lead

New York	3.12½- 3.25
Cleveland	2.50- 2.75
Chicago	2.75- 3.00
St. Louis	3.25- 3.50

Zinc

New York	2.25- 2.50
Cleveland	2.25- 2.50
Chicago	2.25- 2.50
St. Louis	2.75- 3.00

Aluminum

Clips, soft, Cleve.	11.50-12.00
Borings, Cleve.	4.75- 5.00
Mixed, cast, Cleve.	7.25- 7.50
Mixed, cast, St. L.	8.00- 8.50

Secondary Metals □

Brass ingot, 85-5-5-5	8.00
Remelt Al., No. 12	11.50-12.50

Pig Iron

Delivered prices do not include switching charges except as noted. No. 2 foundry iron is 1.75-2.25 silicon; 25-cent differentials apply for each 0.25 silicon above 2.25

Gross Tons

	No. 2 Fdry.	Malleable	Basic	Bessemer
Basing Points:				
Bethlehem, Pa.	$17.50	$18.00	$17.00	$18.50
Birdsboro, Pa.	17.50	18.00	17.00	18.50
Swedeland, Pa.	17.50	18.00	17.00	18.50
Sparrows Point, Md.	17.50	18.00	17.00	18.50
From Swedeland, Pa., del. to Phila.	18.26	18.76	17.76	.....
From Bethlehem, del. to Brooklyn..	19.77	20.27	.....	.....
From Bethlehem, del. to Newark, N. J.	18.99	19.39	.....	.....
Basing Point:				
Everett, Mass	18.00	18.50	17.50	19.00
From Everett, del. to Boston.....	18.00	19.00	18.00	19.50
Basing Point:				
Buffalo	17.50	18.00	16.50	18.50
From Buffalo, del. to Boston.....	18.50	19.00	18.00	19.50
Basing Points:				
Neville Island, Pa.	18.00	18.00	17.50	18.50
Sharpsville, Pa.	17.50	17.50	17.00	18.00
Youngstown, O.	17.50	17.50	17.00	18.00
From Neville Island, Pa., del. to Pittsburgh	(Neville Island base, plus 50 to 76 cents switching charges)			
Basing Points:				
Erie, Pa.	17.50	18.00	17.00	18.50
Cleveland	17.50	17.50	17.00	18.00
Toledo, O.	17.50	17.50	17.00	18.00
Detroit	17.50	17.50	17.00	18.00
From Detroit, del. to Saginaw, Mich.	19.60	19.60	19.10	20.10
From Cleveland, del. to Akron, Canton, O.	18.76	18.76	18.26	19.26
From Toledo, del. to Mansfield, O...	19.26	19.26	18.76	19.76
Basing Point:				
Hamilton, O.	17.50	17.50	17.00	18.00
From Hamilton, del. to Cincinnati	18.51	18.51	18.01	19.01
Do., del. to Indianapolis	19.77	19.77	19.27	20.27
Basing Points:				
Duluth	18.00	18.00	.....	18.50
Chicago	17.50	17.50	17.00	18.00
Granite City, Ill.	17.50	18.00	17.00	.....
From Duluth, del. to St. Paul.....	19.94	19.94	.....	20.44
From Chicago, del. to Milwaukee..	18.50	18.50	18.00	19.00
From Chicago, Toledo or Detroit, del to Muskegon, Mich.	20.40	20.40	19.90	20.90
From Granite City, del. to St. Louis	(Granite City base, plus 50-cent switching charge)			
Basing Point:				
Birmingham, Ala.	13.50	.....	12.50	.....
From Birmingham del. to:				
Boston	18.12	.....	17.62	.....
Newark, N. J.	18.51	.....	.....	.....
Brooklyn, N. Y.	19.39	.....	.....	.....
Baltimore	18.02	.....	17.52	.....
Cleveland	19.64	.....	18.64	.....
Cincinnati	18.23	.....	17.11	.....
Chicago	18.16	.....	19.14	.....
St. Louis	17.62	.....	17.50	.....
Basing Point:				
Provo, Utah	16.50	.....	.....	.....

LOW PHOS.

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.—$22.00. Basing point: Johnson City, Tenn.—.....

Philadelphia, standard and copper bearing..... 23.13

GRAY FORGE		CHARCOAL	
Valley furnace	17.25	Lake Superior fur.	20.50
Pitts. dist. fur.	17.75	Do., del. Chicago	23.54

SILVERY

Jackson County, O., base: 6%—$22.25; 7—$23.25; 8—$24.25; 9—$25.25; 10—$26.25; 11—$27.75.

BESSEMER FERROSILICON

Jackson County, O., base: 10%—27.25; 11—$28.75; 12—$30.25; 13—31.75; 14—$33.25; 15—$34.75; 16—$36.25.

Iron Ore

LAKE SUPERIOR ORE

Gross ton, 51½%, Lower Lake Ports

Old range bess.	$4.30
Mesabi bessemer	4.65
Old range nonbess.	4.65
Mesabi nonbess.	4.50
High phosphorus	4.40

EASTERN LOCAL ORES

Cents, unit, del. E. Pa.

Foundry and basic, 56-63%, con. (nom.)	8.00- 9.00
Cop-free low phos. 58-65% (nom.)	10.00-10.50

FOREIGN ORE

Cents per unit, f.a.s. Atlantic ports (nom.)

Foreign manganiferous ore, 45-55% iron, 6-10% man.	8.50
No. Afr. low phos.	7.00
Swedish basic, 65%	8.00
Swedish low phos.	8.50
Spanish, No. Afr. basic 50 to 60%	7.00
*Tungsten, spot, sh. ton unit, duty pd.	$14.00-14.25
N. F. fdy., 55%	7.00
Chrome ore, 48% gross ton c.i.f.	$17.00-18.00

Manganese Ore

(Nominal)

Prices, not including duty, cents per unit, cargo lots.

Caucasion, 52-55%	22.00
So. African, 52%..	21.00-22.00
So. Afr., 49-51%....	20.00-21.00
Indian, 48-50%	nominal

Refractories

FIRE CLAY BRICK

Per 1000 f.o.b. Works

First Quality

Pa., Ohio, Ill., Ky., Md., Ga., Mo.	$45.00
Alabama	48.00

Second Quality

Pa., Ohio, Ill., Ky., Md., Mo., Ga., Ala.	40.00

MALLEABLE BUNG BRICK	
All bases	50.00
SILICA BRICK	
Pennsylvania	$45.00
Joliet E. Chicago ..	54.00
Birmingham, Ala....	55.00

MAGNESITE BRICK

Per Net Ton, 9 x 4½ x 2½

Burned	$65.00
Unburned	55.00

CHROME BRICK

Per Net Ton

F.o.b. ship. point....	$45.00

MAGNESITE

Dead burned grain, Chester, Pa., Baltimore bases, net	40.00
Domes, Chewelah, Wash., base	22.00

Fluorspar

85 and 5 per cent grade

Washed gravel, duty paid, tide, gross ton	$20.00
Washed gravel f.o.b. Ill., Ky., net ton, carloads	$14.00

Semifinished Steel

Prices Per Gross Ton

BILLETS AND BLOOMS

4 x 4-inch base

Pitts., Chi., Cleve., open-hth. & bess.	$26.00
Philadelphia	31.30
Forging, Pitts., Chi.	31.00
SHEET BARS	
Pitts., Cleve., Yong.	26.00
Chicago	26.00
Canton, O.	26.00
SLABS	
Pitts., Cleve., Yong.	26.00
WIRE RODS	
Pitts., Cleveland	$35.00
Chicago	36.00
SKELP	
All grades, Pitts. and Chicago	1.60c

Coke

Price Per Net Ton

BEEHIVE OVENS

Connellsville fur.	$3.75
Connellsville fdry.	4.25
Connell. prem. fdry.	4.50
New River fdry.	6.00
Wise county fdry.	4.25- 5.00
Wise county fur.	3.50- 4.25
BY-PRODUCT FOUNDRY	
Newark, N. J., del.	8.71- 9.31
Chi. ov., outside del.	8.00
Chicago, del.	8.75
New England, del.	10.50
*St. Louis, del.	8.75
Birmingham, ovens	4.75
Indianapolis, del.	8.75
Ashland, Ky., Connells., basis	5.50
Portsmouth, ovens, Connell. basis	5.50
Buffalo, ovens	7.50- 8.00
Detroit, ovens	8.00
Philadelphia, del	9.00

Ferroalloys

(In dollars, except Ferrochrome)

Ferromanganese, 78-82% tidewater, duty pd.	82.00
del. Pitts.	87.24
Spiegeleisen, 19-20%, dom., fur., spot†	27.00
Ferrosilicon, 50%, frieght all., c. l.	74.50
Do, less carload	82.50
Do, 75 per cent.	120 130.00
Spot, $5 a ton higher	
Silicomang., 2½ carb	85.00
2% carbon	90.00
1% carbon	100.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb con. del.	9.50
Do. spot del.	10.00
Ferrotungsten, stand., lb. cont.	1.16- 1.25
Ferrovanadium, 35 to 40%, lb. cont., on analysis	2.60- 2.80
Ferrotitanium, c.l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton., frt., all., lb.	7.00
Do, under 1 ton	7.50
Ferrophosphorus, per ton, c. l. 17-19%, Rockdale, Tenn., basis; 18%, $2 unitage	50.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage	65.00
Ferromolybdenum, stand. 50-60%, lb	0.95
Molybdate, lb. cont.	0.80

†Carloads. Quan. diff. apply.

Coke By-Products

Per gallon, producers' plants, Tank lots

	Spot
Pure benzol	$0.22
90 per cent benzol..	0.22
Toluol	0.30
Solvent naphtha	0.26
Commercial xylol...	0.26

Per lb., producers' plants in 250-lb. Drums

Phenol	0.153-0.173

Per lb., producers' plants

*Naphthalene flakes and balls	6.00- 7.25

Per 100 lb., Atlantic seaboard

Sulphate of ammonia	$1.20

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS

Baltimore*	2.60c
Boston††	2.65c
Buffalo	2.95c
Chattanooga	3.05c
Chicago	2.90c
Cincinnati	3.10c
Cleveland	2.90c
Detroit	2.98½c
Houston	2.40c
Los Ang.	3.30c
New Orleans	3.00c
New York‡(d)	3.17c
Philadelphia*	2.60c
Pittsburgh	2.85c
Portland	3.40c
San Fran.	3.30c
Seattle	3.40c
St. Louis	3.14c
St. Paul	3.00c
Tulsa	3.25c

IRON BARS ☐

Baltimore*	2.60c
Boston	3.25c
Chattanooga	3.05c
Chicago	2.75c
Cincinnati	3.10c
Detroit	2.98½c
New York‡(d)	3.10c
Philadelphia*	2.60c
St. Louis	3.14c
Tulsa	3.25c

REINFORC. BARS ☐

Baltimore	2.35c-3.00c
Boston	2.75c-3.25c
Buffalo	1.95c
Chattanooga	3.05c
Chicago	1.95c-2.10c
Cincinnati	3.10c
Cleveland	2.22½c
Detroit	2.85c
Houston	3.00c
Los Ang. cl.	3.00c
New Orleans	3.00c
New York	3.17c
Phila.	2.62½c
Pittsburgh	3.00c
San Fran.	3.15c
Seattle	3.50c
St. Louis	3.29c
Tulsa	3.25c
Young.	2.30c-2.60c

SHAPES ☐

Baltimore*	2.60c
Boston††	2.75c
Buffalo	3.20c
Chattanooga	3.30c
Chicago	3.10c
Cincinnati	3.30c
Cleveland	3.21c
Detroit	3.30c
Houston	2.65c
Los Ang.	3.30c
New Orleans	3.50c
New York(d)	3.27c
Philadelphia*	2.60c
Pittsburgh	3.05c
Portland	3.40c
San Fran.	3.30c
Seattle	3.40c
St. Louis	3.34c
St. Paul	3.25c
Tulsa	3.50c

PLATES ☐

Baltimore*	2.60c
Boston††	2.75c
Buffalo	3.20c
Chattanooga	3.30c
Chicago	3.10c
Cincinnati	3.30c
Cleveland, ¼ in. and thicker	3.21c
Cleve., 3/16-in	3.20c
Detroit	3.30c
Det., 3/16-in.	3.10c
Houston	3.00c
Los Angeles	3.30c
New Orleans	3.50c
New York (d)	3.30c
Philadelphia*	2.60c
Phila. floor	4.35c
Pittsburgh	3.05c
Portland	3.40c
San Fran.	3.30c
Seattle	3.40c
St. Louis	3.34c
St. Paul	3.25c
Tulsa	3.50c

NO. 10 BLUE ☐

Baltimore*	2.75c
Boston††	2.65c
Buffalo	3.10c
Chattanooga	3.50c
Chicago	2.95c
Cincinnati	3.10c
Cleveland	3.01c
Det., 8-10 ga.	3.03½c
Houston	3.35c
Los Ang.	3.45c
New Orleans	3.50c
New York	3.17c
Portland	3.65c
Philadelphia*	2.75c
Pitts.	2.85c
San Fran.	3.53c
Seattle	3.65c
St. Louis	3.19c-3.36c
St. Paul	3.45c
Tulsa	3.70c

NO. 24 BLACK ☐

Balt.*†	3.50c
Boston††	3.75c
Buffalo	3.25c
Chattanooga	4.00c
Chicago	3.70c
Cincinnati	3.85c
Cleveland	3.76c
Detroit	3.78½c
Los Ang.	4.05c
New York	3.65c
Philadelphia*†	3.40c
Pitts.	3.35c
Portland	4.25c
San Fran.	4.15c
Seattle	4.25c
St. Louis	3.94c
St. Paul	3.695c
Tulsa	4.75c

NO. 24 GAL. SHEETS ☐

Balt.*†	3.75c
Buffalo	4.00c
Boston††	4.25c
Chattanooga	4.25c
Chicago	4.20c-4.30c
Cincinnati	4.45c
Cleveland	4.36c
Detroit	4.45c
Houston	3.57c
Los Ang.	4.65c
New Orleans	4.35c
New York	4.25c
Pitts.**	3.95c-4.20c
Portland	4.85c
San Fran.	4.75c
Seattle	4.85c
St. Louis	4.54c
St. Paul	4.19c
Tulsa	5.10c
Philadelphia*†	4.00c

BANDS ☐

Baltimore	2.90c
Boston††	3.15c
Buffalo	3.30c
Chattanooga	3.25c
Chicago	3.20c
Cincinnati	3.35c
Cleveland	3.26c
Det. 3/16-in. & lighter	3.28½c
Houston	2.80c
Los Ang.	3.80c
New Orleans	3.20c
New York(d)	3.42c
Philadelphia	2.90c
Pittsburgh	3.10c
Portland	3.90c
San Fran.	3.15c
Seattle	3.90c
St. Paul	3.20c
Tulsa	3.45c
St. Louis	3.45c

HOOPS ☐

Baltimore	2.80c
Boston	4.90c
Buffalo	3.55c
Chicago	3.20c
Cincinnati	3.35c
Det. No. 14 & lighter	3.28½c
New York	3.42c
Philadelphia	3.15c
Pittsburgh	3.75c
Seattle	5.40c
St. Paul	3.75c

COLD FIN. STEEL ☐

Baltimore (e)	3.33c
Boston	3.68c-4.18c
Buffalo	3.25c
Chattanooga*	3.90c
Chicago	3.25c
Cincinnati	3.55c
Clevel'd, flats	3.40c
Do., rounds squares, hexagons	3.25c
Detroit	3.40c
Los Ang.	5.85c
New Orleans	4.25c
New York	3.79c
Philadelphia	3.58c
Pittsburgh	3.20c
Portland (f)	4.75c
San Fran. (d)	5.85c
Seattle (f)	4.75c
St. Paul	3.20c
St. Louis	3.75c
Tulsa	4.65c

COLD ROLL. STRIP ☐

Boston 0.100 in., 500 lb lots	5.20c
Buffalo	5.25c
Chicago (b)	5.65c
Cincinnati	5.80c
Cleve. (b)	5.55c
Detroit	5.40c
Philadelphia	4.55c
New York	4.55c

(a) Rounds, hex. only

(b) Net base straightening, cutting boxing 1 ton or more.

(c) Plus mill, size and quantity extras.

(d) Minus quant. diff.

(e) New mill classif

(f) Rounds only.

‡Domestic bars.

*Plus quan. extras.

**Under 25 bundles.

*†50 or more bundles

†New extras apply.

††Base 40,000 lbs., extras on less.

Prices at Detroit, Cleveland, Chicago, Pittsburgh, Cincinnati, Chattanooga and St. Louis on heavier lines are subject to new quantity differentials:

399 pounds and less, up 50 cents; 400 to 3999 pounds, base; 4000 to 7999 pounds, 15 cents off; 8000 to 14,999 pounds, 30 cents off; 15,000 to 39,999 pounds, 50 cents off; 40,000 pounds and over, 60 cents off.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Oct. 19

Export Prices f.o.b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports £ s d		Continental Channel or North Sea ports, metric tons Gold parity, $4.8665 £ s d	
PIG IRON				
Foundry, 2.50-3.00 Silicon	$13.28	2 18 6	$8.52	1 15 0
Basic bessemer	12.26	2 14 0*	7.30	1 10 0
Hematite, Phos. .03-.05	13.62	3 0 0	....	.....
SEMIFINISHED STEEL				
Billets	$23.84	5 5 0	$11.44	2 7 0
Wire rods, No. 5 gage	34.05	7 10 0	21.90	4 10 0
FINISHED STEEL				
Standard rails	$35.19	7 15 0	$26.77	5 10 0
Merchant bars	1.37c	6 15 0	.66c	3 0 0
Structural shapes	1.50c	7 7 6	.61c	2 15 0
Plates, †¼ in. or 5 mm.	1.67c	8 5 0	.86c	3 18 6
Sheets, black, 24 gage or 0.5 mm.	1.88c	9 5 0	1.27c	5 15 0
Sheets, gal., 24 gage, corr.	2.28c	11 5 0	1.54c	7 0 0
Bands and strips	1.57c	7 15 0	.83c	3 15 0
Plain wire, base	1.78c	8 15 0	1.18c	5 7 6
Galvanized wire, base	2.13c	10 10 0	1.38c to 1.40c	6 5 6 to 6 7 6
Wire nails, base	2.44c	12 0 0	1.27c	5 15 0
Tin plate box 108 lbs.	$ 3.80	0 16 9	.....	.....

British ferromanganese $82 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d $(43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

		L s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$14.19	3 2 6(a)	$12.00	215	$12.17	305	$21.48	63
Basic bessemer pig iron	13.39	2 19 0(a)*	10.32	185	11.57	290	23.70	69.50
Furnace coke	3.23	0 14 3	6.70	120	4.39	110	6.56	19.25
Billets	23.84	5 5 0	22.60	405	17.56	440	32.91	96.50
Standard rails	1.67c	8 5 0	1.75c	700	1.98c	1,100(b)	2.05c	132
Merchant bars	1.40c	6 17 6	1.40c	560	.96c	535	1.71c	110
Structural shapes	1.78c	8 15 0	1.38c	550	.96c	535	1.67c	107.50
Plates, †¼-in. or 5 mm.	1.73c	8 10 0	1.70c	680	1.22c	675	1.97c	127
Sheets, black	2.08c	10 5 0§	2.13c	850‡	1.35c	750‡	2.23c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	2.59c	12 15 0	3.63c	1,450	2.61c	1,450	5.74c	370
Plain wire	1.78c	8 15 0	2.83c	1,130	2.34c	1,300	2.74c	177
Bands and strips	1.93c	9 10 0	1.63c	650	1.22c	675	1.97c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel a del. Middlesbrough. b Since January.

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	9.50-10.50
Boston, dealers	6.25- 6.75
Buffalo, No. 1	10.50-11.00
Buffalo, No. 2	9.00-10.00
Chicago	9.00- 9.50
Cleve., No. 1	10.00-10.50
Cleve., No. 2	9.50-10.00
Detroit, No. 1	7.00- 7.50
Detroit, No. 2	6.25- 6.75
Eastern Pa.	10.00
Eastern Pa., No. 2	9.50
Federal, Ill.	8.25- 8.75
Granite City, Ill.	8.00- 8.50
N. Y., deal. R. R.	7.50
N. Y., deal. No. 2	6.50
Pitts., No. 1	12.50-13.00
St. L., No. 1 del.	9.25- 9.75
Valleys, No. 1	13.00-13.50

COMPRESSED SHEETS

Buffalo, dealers	9.00-10.00
Chi. (Factory)	7.50- 8.00
Cleveland	9.25- 9.75
Detroit	7.00- 7.50
E. Pa., new mat.	9.50-10.00
Pittsburgh	12.00-12.50
Valleys	12.50-13.00

BUNDLED SHEETS

Buffalo	5.50- 6.00
Cincinnati, del.	5.75- 6.25
Cleveland	7.75- 8.25
Eastern Pa.	9.00- 9.50
Pittsburgh	11.00-11.50
St. Louis	6.00- 6.50

SHEET CLIPPINGS LOOSE

Chicago	4.00- 4.50
Cincinnati	4.50- 5.00
Detroit	5.00- 5.50
St. Louis	5.00- 5.50

STEEL RAILS, SHORT

Birmingham	11.50-12.00
Boston, dealers	7.00- 7.25
Buffalo	12.00-12.50
Chicago (3 ft.)	10.50-11.00
Chicago (2 ft.)	11.00-11.50
Cincinnati, del.	11.00-11.50
Detroit	9.00- 9.50
Pitts., (open-hearth, 3 ft. and less)	14.50-15.00
St. Louis	10.50-11.00

STOVE PLATE

Birmingham	6.75- 7.00
Boston, dealers	4.50- 4.75
Buffalo	9.00- 9.50
Chicago, net	6.50- 7.00
Cinci., deal.	6.50- 7.00
Detroit, net	4.50- 5.00
Eastern Pa.	8.50- 9.00
N. Y., deal. Fdry.	6.00
St. Louis	7.00- 7.50

COUPLERS, SPRINGS

Buffalo	11.50-12.00
Chicago	10.00-10.50
Eastern Pa.	13.50-14.00
Pittsburgh	14.50-15.00
St. Louis	10.00-10.50

ANGLE BARS—STEEL

Chicago	10.00-10.50
St. Louis	9.50-10.00

LOW PHOSPHORUS

Buffalo, billets and bloom crops	11.50-12.50
Cleveland bil. and bloom crops	12.50-13.50
Eastern Pa. crops	14.00-14.50
Pittsburgh billet bloom crops	14.50-15.00
Pitts., sheet bar crops	14.50-15.00

FROGS, SWITCHES

Chicago	9.00- 9.50
St. Louis	10.00-10.50

SHOVELING STEEL

Chicago	9.00- 9.50
Cleveland	10.50-11.00
St. Louis	8.25- 8.75

RAILROAD WROUGHT

Birmingham	8.00- 8.25
Boston, dealers	2.00- 2.50
Buffalo, No. 1	7.00- 8.00
Buffalo, No. 2	10.50-11.00
Chi., No. 1, net	8.00- 8.50
Chi., No. 2	9.00- 9.50
Cinci., No. 2	8.50- 9.00
Eastern Pa.	10.50
N. Y., No. 1 deal.	7.00- 7.50
Pitts., No. 1	12.50-13.00
St. Louis, No. 1	7.00- 7.50
St. Louis, No. 2	8.25- 8.75

SPECIFICATION PIPE

Boston	4.00- 4.50
Eastern Pa.	9.50-10.00
N. Y., deal.	4.75- 5.25

BUSHELING

Buffalo, No. 1	9.00-10.00
Chicago, No. 1	7.50- 8.00
Cinci., No. 1 deal.	6.25- 6.75
Cinci., No. 2	2.75- 3.25
Cleve., No. 2	8.00- 8.25
Det., No. 1 new	6.25- 6.75
St. Louis, No. 1	6.50- 7.00
Val. new No. 1	12.50-13.00

MACHINE TURNINGS

Birmingham	4.00- 5.00
Boston, dealers	2.25- 2.50
Buffalo	6.25- 7.00
Chicago	5.00- 5.50
Cinci., deal.	5.00- 5.50
Cleveland	7.00- 7.50
Detroit	5.50- 6.00
Eastern Pa.	6.50
N. Y., deal.	4.00- 4.50
Pittsburgh	9.50-10.00
St. Louis	4.50- 5.00
Valleys	10.75-11.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston, dealers	2.50- 2.75
Buffalo	6.25- 7.00
Cinci., deal.	4.75- 5.25
Cleveland	7.25- 7.50
Detroit	6.25- 6.75
Eastern Pa.	5.50- 6.00
N. Y., deal.	3.00
Pittsburgh	9.25- 9.75

CAST IRON BORINGS

Birming., plain	3.50- 4.50
Boston, chem.	10.00-11.00
Boston, dealers	3.25- 3.50
Buffalo	6.25- 7.00
Chicago	5.50- 6.00
Cinci., deal.	4.75- 5.25
Cleveland	7.25- 7.50
Detroit	6.25- 6.75
E. Pa., chem.	12.00-15.00
N. Y., deal.	3.00
Pittsburgh	8.50- 9.00
St. Louis	4.50- 5.00

PIPE AND FLUES

Cinci., deal.	4.50- 5.00

RAILROAD GRATE BARS

Buffalo	5.00- 5.50
Chicago, net	6.50- 7.00
Cincinnati	4.75- 5.25
Eastern Pa.	8.50- 9.00
N. Y., deal.	5.25- 5.50
St. Louis	6.00- 6.50

FORGE FLASHINGS

Boston, dealers	5.00- 5.50
Buffalo	9.00- 9.50
Cleve., over 10-in.	9.00- 9.50
Detroit	6.00- 6.50

FORGE SCRAP

Boston, dealers	4.00- 4.50
Chicago (heavy)	10.50-11.00
Eastern Pa.	10.00

ARCH BARS, TRANSOMS

Chicago, net	7.50- 8.00
St. Louis	9.50-10.00

AXLE TURNINGS

Boston, dealers	3.50- 3.75
Buffalo	7.50- 8.00
Chi., elec. fur.	7.50- 8.00
Cleveland	9.50-10.00
Eastern Pa.	9.50-10.00
St. Louis	5.50- 6.00

STEEL CAR AXLES

Birmingham	11.00-11.50
Boston, ship. point.	8.00- 8.50
Buffalo	10.00-11.00
Chicago, net	10.00-10.50
Eastern Pa.	15.50
St. Louis	11.50-12.00

SHAFTING

Boston, ship. point.	9.25-9.50
Eastern Pa.	15.00-15.50
N. Y., deal	10.00-10.25
St. Louis	8.00- 8.50

CAR WHEELS

Birming., iron	9.00- 9.50
Boston, iron deal.	6.75- 7.25
Buffalo, iron	8.00- 9.00
Buffalo, steel	11.00-11.50
Chicago, iron	9.00- 9.50
Chi., rolled steel	10.00-10.50
Cincinnati, iron	8.00- 8.50
E. Pa., iron	12.00-13.00
E. Pa., steel	13.50-14.00
Pitts., iron	11.75-12.25
Pitts., steel	14.50-15.00
St. Louis, iron	7.50- 8.00
St. Louis, steel	10.00-10.50

NO. 1 CAST SCRAP

Birmingham	9.00-10.00
Boston, No. 2	5.00- 5.50
Boston, Tex. con.	10.75-11.00
Buffalo, cupola	10.00-10.50
Buffalo (mach.)	10.00-11.50
Chicago, agri. net	7.50- 8.00
Chi., mach. net	8.50- 9.00
Chi., railroad net	8.00- 8.50
Cinci., mach. cup	8.00- 8.50
Cleve., cupola	10.50-11.00
Detroit, net	8.00- 8.50
E. Pa., cupola	12.00
N. Y., cup. deal.	6.00- 6.50
N. Y., del. local foundries	9.00- 9.50
Pitts., cupola	11.50-12.00
San Fran., del.	13.50-14.00
Seattle	4.50- 6.50
St. Louis, No. 1	8.50- 9.00
St. L., No. 1 mach.	9.00- 9.50

HEAVY CAST

Boston, del.	5.75- 6.00
Buffalo, break	7.00- 8.00
Cleve., break	7.50- 8.00
Detroit, break	5.50- 6.00
Detroit, auto net	8.50- 9.00
Eastern Pa.	10.50-11.00
N. Y., No. 1, deal.	7.00- 7.50
N. Y., break. deal.	6.00- 6.50
Pittsburgh	11.00-11.50

MALLEABLE

Boston, consum.	13.00-13.50
Buffalo	11.00-12.00
Chicago, R. R.	9.75-10.25
Cinci., agri. del.	8.00- 8.50
Cinci., R. R. del.	8.50- 9.00
Cleveland, rail	11.50-12.00
Detroit, auto	7.50- 8.00
St. Louis, R. R.	9.00- 9.50
Eastern Pa., R. R.	12.50-13.00

RAILS FOR ROLLING

5 feet and over

Birmingham	10.00-11.00
Boston, dealers	7.00- 7.25
Buffalo	9.00- 9.50
Chicago	10.75-11.25
Eastern Pa.	12.50
New York, dealer	7.50- 8.00
St. Louis	10.00-10.50

LOCOMOTIVE TIRES

Chicago (cut)	10.00-10.50
St. L., No. 1	8.50- 9.00

LOW PHOS. PUNCHINGS

Buffalo	11.00-11.50
Chicago	10.50-11.00
Eastern Pa.	12.50-13.50
Pittsburgh	14.50-15.00

Nonferrous Metal Prices of the Week

Spot unless otherwise specified. Cents per pound

	Copper: Electro., del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin New York: Spot	Straits Tin New York: Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 98-99%	Antimony Spot, N. Y.	Ingot Nickel
Oct. 14	8.00	9.12½	7.75	46.87½	47.25	4.50	4.35	4.75	*22.90	6.87½	35.00
Oct. 16	8.00	8.12½	7.75	46.50	46.87½	4.40	4.25	4.75	*22.90	6.87½	35.00
Oct. 17	7.75	8.12½	7.50	46.75	47.12½	4.25	4.10	4.75	*22.90	6.87½	35.00
Oct. 18	7.50	7.87½	7.25	46.37½	46.70	4.10	3.95	4.75	*22.90	6.75	35.00
Oct. 19	7.50	8.12½	7.25	46.12½	46.42½	4.00	3.90	4.75	*22.90	6.75	35.00
Oct. 20	7.50	8.12½	7.25	46.00	46.30	4.00	3.90	4.75	*22.90	6.75	35.00

*Nominal quotation. Market range 19.90c to 22.90c.

Bars

Bar Prices, Page 50

Pittsburgh—A possible further advance in hot-rolled bars by at least $3 a ton is reported being considered. Producers, while yet unwilling to take definite action, have shown that increased manufacturing costs have not nearly been compensated for by the recent advance to 1.75c base, Pittsburgh. This has been tested only on a few small sales. Shipments against third quarter contracts are now generally completed and the absence of new buying, which would be at 1.75c base, was especially noted last week. Alloy bars are being based on 2.45c, Pittsburgh, although with the operation of the code the S.A.E. 9250 series for flats, rounds and squares now is based on the carbon bar card. This formerly was based on the alloy bar price with 25 cents up for flats and 50 cents up for rounds and squares. New revised extras are quoted for the 9250 series but these are now added to the 1.75c carbon bar price.

Cleveland—Sales at the new price of 1.80c, base, Cleveland, as well as specifications on fourth quarter contracts booked late in September at 1.60c, are light. An outstanding purchase in the week was 450 tons by an automotive interest. However, the combination of heavy stocking by the automotive industry on third quarter contracts, and the recession in automotive production, pending model changes, has made for a quieter demand from that source. Evidences appear that a few miscellaneous users were too conservative in estimating fourth quarter requirements under the percentage contract form, as they will take out by the close of this month all they covered for the quarter, which will necessitate their buying later at the advance of $3 a ton. Producers are trying to simplify the code arrangements applying to trucking.

Chicago—Demand for steel bars is holding better than for most other products, with business of a diversified nature. Automotive buying is only fair. These orders are expected, however, in the near future. Specifications are lighter than recently when contracts were expiring but new sales are fairly steady. Soft steel bars continue 1.80c, Chicago, with rail steel bars 1.70c.

Boston — Specifications against fourth quarter contracts are light with indications shipments next month will be heavier, as consumer stocks are small. Most of this volume will be billed at prices previous to the $3 advance to 1.85c, Buffalo. Spot buying of commercial steel bars at the higher quotations has been light.

New York—Commercial steel bar sellers are encouraged over improved volume of contract specifications, although inquiry is slow. The market is unchanged at 2.08c, delivered.

Philadelphia — Commercial steel bar specifications are light and for common bars negligible. A small quantity is going into ship work, but sellers look for no real improvement soon unless railroads become more active in purchase of equipment. Commercial steel bars are 1.75c, Pittsburgh, or 2.04c, Philadelphia, and common iron bars 1.74c, Philadelphia.

Jos. P. Cattie & Bros. and Enterprise Galvanizing Co., both of Philadelphia, divided approximately 200 tons of galvanized medium flat bar steel for the navy; bids Oct. 6.

Plates

Plate Prices, Page 50

Pittsburgh—Plans are out for 48 pontoons, each 48 x 18 x 2 feet 10 inches, which the Memphis, Tenn., federal engineers will close on Oct. 31. Each requires approximately 15 tons of plates. The same buyers are asking bids at the same time on 48 sections of steel dredging pipe 32 inches in diameter and 52 feet in length, approximately 200 tons. An Alabama fabricator is low on the Greenville, Miss., floating wharf, 700 tons. Plates are quoted 1.70c firmly, but there have been few takers at the new price, most important buyers having covered at less. Practically no tank work is before bidders and railroads are not in the market. Bids have been asked of Pittsburgh plate shops for 20 steel gas buoys by the Staten Island, N. Y., lighthouse superintendent, bids to close Nov. 9. A Huntington, W. Va., coal dealer has dropped an inquiry for 20 steel barges and is buying 30 wood barges.

Cleveland—New business is well diversified, but restricted to small orders. Some improvement is noted in requirements from boilermakers and builders of heavy machinery. One order from the latter source calls for plates 9¼ inches thick. Brewery tank work is tapering. Mills completed practically all their third quarter contracts by Oct. 15. The Cleveland plate mill's operating rate has dropped from 50 per cent to 30 per cent.

Chicago—Inquiries for tanks and other fabricated plate products are fewer. Tank requirements for breweries are lighter, financing difficulties having been encountered by a number of companies proposing new construction. Some inquiries are pending for distilleries, with others in prospect. The river barge market is quiet although considerable business is anticipated when the recently completed Illinois waterway is available for more extensive operation in the Chicago district.

Boston—Plate buying is light, but some scattered miscellaneous business is being done at 1.80c, Coatesville, Pa. Most consumers covered moderately for this quarter at 1.70c, Coatesville. Shipyards are using more material.

New York—While miscellaneous demand for steel plates is quiet about 1000 tons will be required for generators for Boulder dam and a substantial tonnage for car repair programs for two eastern railroads. In addition about 4000 tons of special steel plates will be needed for Boulder dam. Plates are firm at 1.98c, delivered.

Philadelphia — Prospective ship work continues to increase, with bids opening Oct. 25 on nine small patrol boats for the cost guard requiring 600 tons of plates and 450 tons of shapes, and with seven 300-foot cutters and four tug boats also for the coast guard taking close to 4000 tons of steel, of which approximately 2875 will be plates. Specifications for the latter are expected in November. In addition, as previously noted, about 8200 tons of steel is expected to be brought out late this month for two cruisers, about two thirds plates. Pusey & Jones, Wilmington, Del., and the De Foe Shipbuilding Co., Bay City, Mich., have been awarded three and two coast guard cutters, respectively, the total requiring 1390 tons of plates. Plate mill operations in this district have declined. The market is 1.80c, Coatesville, or 1.88½c, Philadelphia.

Contracts Placed

280 tons, 78 tanks, Mitchell Brewing Co., El Paso, Tex., to Darbyshire-Harvie Iron & Machinery Co., El Paso, Tex.

250 tons, fuel oil storage tank, eleventh naval district, California, to Chicago Bridge & Iron Works, Chicago.

230 tons, 38 tanks, City Ice & Fuel Co., Miami, Fla., to Birmingham Tank Co., Birmingham, Ala.

190 tons, furnace shell, Pueblo, Colo., to William B. Pollock Co., Youngstown, O., through H. A. Brassert & Co., Chicago.

Contracts Pending

2875 tons, approximately, seven 300-foot cutters and four tug boats for the

United States coast guard, specifications expected out early in November; several hundred tons of shapes and possibly 50 or 60 tons of bars will also be required.

1390 tons, five coast guard cutters, three to be built by Pusey & Jones, Wilmington, Del., and two by the De Foe Shipbuilding Co., Bay City, Mich.; several hundred tons of shapes will be required, but relatively few bars.

950 tons, 48 pontoons for the federal engineers, Memphis, Tenn., each 48 x 18 x 2 feet 10 inches; bids Oct. 31.

700 tons, floating drydock, Greenville, Miss.; Alabama Dry Dock & Shipbuilding Co., Mobile, Ala., low.

600 tons, nine small patrol boats for the United States Coast Guard; bids Oct. 25; 450 tons of shapes also will be required, and a small tonnage of bars.

500 tons, 1,000,000-gallon tank, water system, Newport News, Va.; federal loan approved, bids soon.

200 tons, 48 dredge pipe sections, each 52 feet long and 32 inches i. d., for federal engineers, Memphis, Tenn.; bids Oct. 31.

150 tons, 55,000-barrel tank for naval base, San Diego, Calif., Chicago Bridge & Iron Works, Chicago, low.

135 tons, standpipe, Wildwood, N. J., Eugene Verga, Camden, N. J., general contractor.

100 tons, 20 steel gas buoys of six types from 9-foot diameter by 32 feet long to 5-foot diameter by 15 feet long, for superintendent of lighthouses, Staten Island, N. Y.; bids Nov. 9.

Unstated tonnage, two open-deck steel barges for Chicago federal engineers, each 40 x 14 x 3½ feet; bids Nov. 9.

Sheets

Sheet Prices, Page 50

Cleveland—Sheet production has dropped sharply, following the heavy shipments on third quarter contracts, which in nearly all instances were completed Oct. 15, as required by the steel code. The Cleveland mill which was operating near capacity now is working at 35 per cent; and sheet mills in a nearby lake district serving the automotive industry have been reduced to around 60 per cent. Only small purchases are being made by automobile interests, and owing to their heavy stocks, volume buying is not expected for at least 30 days. More figuring is being done, however, as builders prepare for new models. Barrel manufacturers continue to take substantial shipments, being more active than in several months. Prices are steady.

Pittsburgh—Sheet buying remains inconsequential, although occasional orders of some size are noted. Buying has reverted to an uneven trend, with a general condition of heavy inventories reflecting itself in smaller commitments from the larger consumers. Base prices on black and galvanized sheets are 2.25c and 2.85c, Pittsburgh, respectively. Cold-rolled sheets are firm on new business at 2.30c and 2.75c, respectively, for heavy and light gages.

Chicago—While sheet production remains fairly heavy, quietness in new specifications affects the outlook for coming weeks. New business is increasing but some consumers are covered on requirements a short period ahead by tonnage received against old contracts and this is delaying specifications. Automotive requirements reflect reduced operations, a seasonal trend, with some improvement anticipated next month. Farm implement manufacturers account for only small tonnages, while roofing material continues in light demand in farm areas.

Boston—While a few consumers of sheets continue to take fair shipments, new buying is spotty. Users are slow to release specifications, and the jobbing trade has developed little new volume. Prices are unchanged with galvanized 2.85c, Pittsburgh; black 2.25c, and blue annealed 1.75c.

New York—Sheet tonnage has declined further, with sellers seeing few prospects of early improvement. Meanwhile, prices are unchanged at 2.08c, New York, for No. 10 hot rolled; 2.58c for No. 24 black; 3.18c for galvanized; 2.63c for No. 10 hot rolled; and 3.08c for No. 20 cold rolled.

Philadelphia — Except for continued good specifications from stovemakers, sheet demand here is sluggish. Mill operations have declined steadily since the middle of the month. Autobody makers in this district found no relief in the corrected version of Commercial Resolution No. 13, released by the American Iron and Steel institute, setting up certain prices applicable to Detroit and the Michigan district. Local autobody makers contend that the Michigan prices discriminate against them.

Buffalo—Buffalo district sheet mills which operated at 70 to 80 per cent during September and early part of October now are at 40 per cent.

Cincinnati — Slower operating schedules are in effect in district sheet mills, shipments against third quarter contracts having been completed. Buying for new automotive models has been retarded by adverse labor conditions in that field.

St. Louis—New business is quiet, and shipments for October are likely to be considerably less than the September total. Southern areas are purchasing galvanized roofing in larger volume, but this gain is smaller than the usual seasonal expectation.

Birmingham, Ala.—Little change is noted in the quiet demand for sheets.

Pipe

Pipe Prices, Page 51

Pittsburgh—Slight increase is noticeable in demand for small sizes of butt and lap-weld pipe where orders from heating contractors have been seasonally improved so far in October. In all, the market for tubular goods is barely holding its own with the September rate and shows no evidence of early improvement. The continued absence of line pipe orders and inquiries is felt keenly by mills in this district. Memphis, Tenn., federal engineers are taking bids on forty-eight 52-foot lengths of 32-inch welded pipe. Several hundred tons of pipe are required for the Gallipolis, O., and Winfield, W. Va., locks, Dravo Contracting Co., Pittsburgh, being low on the general contract for both.

Chicago—Pipe producers who received contracts months ago for sanitary district work here for which an $8,000,000 federal loan has been approved are expected to furnish material at original prices instead of submitting new bids, with the question of additional compensaton to be adjusted later. Several sewage disposal plants are to be built in northern Indiana at the direction of the government, important works to be located at Michigan City and Ft. Wayne. While attempts are being made to speed the granting of loans for water system construction, pipe orders continue light and only a small portion of this work is expected to be started over the balance of this year.

Boston—Prospects for heavier buying of cast pipe are brighter with the approval of several federal loans for public works. Bids are in on about 1800 tons for Townsend, Mass., and 6000 tons for Providence, R. I., has been placed.

New York—Specifications are expected soon on 12,000 tons of cast pipe for Puerto Rico. Bids are in on 25,000 tons of 48-inch cast pipe for Mexico City, domestic foundries competing for the business. Newport News, Va., also will buy a tonnage.

Birmingham — Contracting has shown no change from a slow rate. Operations in pipe plants average about 40 per cent.

Cast Pipe Placed

6000 tons, 24-inch and under, Providence, R. I., to R. D. Wood & Co., Florence, N. J.

600 tons, Richford, Vt., to R. D. Wood & Co., Florence, N. J.

325 tons, 10-inch, class 150, navy yard improvement, Puget Sound, Wash.; to United States Pipe & Foundry Co., Burlington, N. J.

100 tons, 8-inch, cement lined, Norris dam, Tennessee Valley Authority; to National Cast Iron Pipe Co., Birmingham, Ala.

Steel Pipe Placed

Unstated tonnage, 4305 steel boiler tubes, eastern navy yards; to Ellwood Ivins' Steel Tube Works, Philadelphia; bids Sept. 26.

Cast Pipe Pending

25,000 tons, 48-inch, Mexico City, Mexico; bids in.

12,000 tons, 6 to 16-inch, water system extensions, Porto Rico; completing specifications for bids soon.

4500 tons, 30-inch and under, Newport News, Va., to replace stave pipe with cast iron; application made for federal loan.

4500 tons, White Point outfall sewer, Los Angeles county sanitation district No. 5, Los Angeles; application made for federal loan.

800 tons, 4 to 10-inch, water and gas lines, housing development, near Jamaica, Long Island, N. Y.

425 tons, state highway projects, Forest Hills and Kew Gardens, N. Y.

200 tons, Hamilton Field, Calif.; bids in.

170 tons, Quincy, Mass.; bids in.

110 tons, 4 to 8-inch, class 150, Beverly Hills, Calif.; bids in.

110 tons, small sizes, Gardner, Mass.

Unstated tonnage, 6281 feet, water tunnel repairs, Glenwood Springs, Colo.; application made for federal loan to cover 30 per cent of project.

Steel Pipe Pending

Unstated tonnage, 8200 feet for intake work at Santa Maria reservoir near Creede, Colo.; federal loan approved; bids soon.

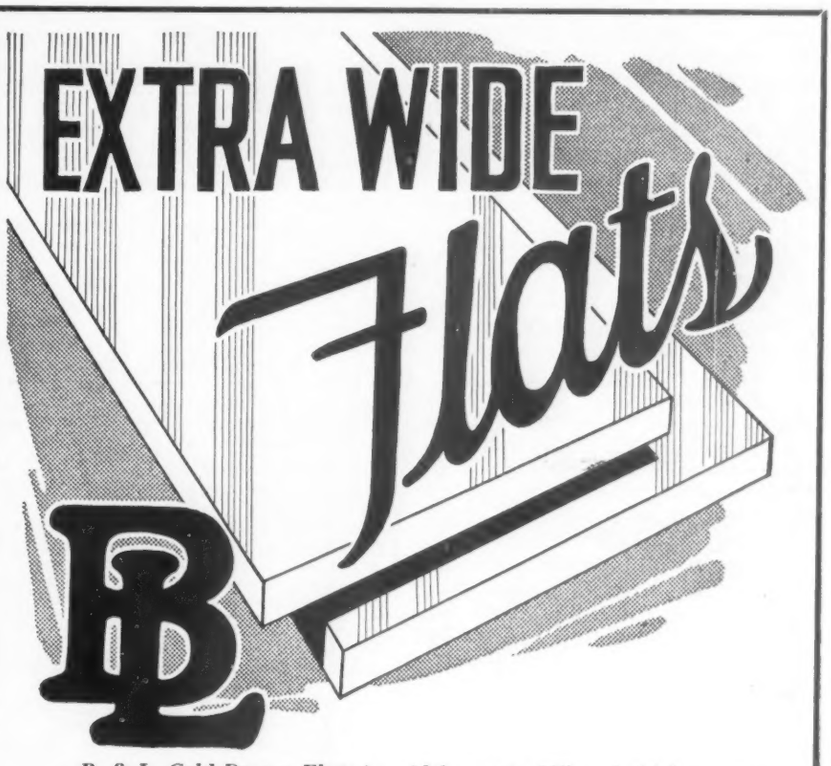
Tin Plate

Tin Plate Prices, Page 50

New York—Opening of books by producers for next quarter by Nov. 1 is considered possible. This year not only is the question of price involved, but also discount terms and length of contracts, as affected by the steel code. Normally, manufacturers' contracts are for a 6-month period, and jobbers' three months. However, under the code the general limitation is four months. Some believe this ruling will be modified to meet the rather exacting demand of the tin plate trade. Under the code, also, a discount of one-half of 1 per cent only should apply on the new contracts, it is said. The present discount to tin plate consumers is 2 per cent.

Pittsburgh—Sometime within the next few weeks, the 1934 contract tin plate price is due for announcement. It generally is conceded an advance will be made from the present $4.25 market, but the extent is not disclosed. Rumors are heard of a probable $5 market. The present spot price is $4.65. Tin mill black sheets, at present 2.50c base, Pittsburgh, probably would share in the advance. Tin mill operations have expanded 10 points in the Pittsburgh district, and now are at 95 per cent of capacity. Canmakers' specifications still are heavy, and stocks of tin plate in their hands are increasing.

Bucyrus-Erie Co., South Milwaukee, Wis., experienced a 10 to 15 per cent increase in business in August over July and a substantial improvement over August, 1932. New orders are mainly for excavating equipment, although all lines have made a gain. Export business in power shovels and other equipment is also improving.



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The standard widths are 8", 10" and 12" with thickness ¼" to 2". Intermediate widths can be furnished when desired. All of these extra wide flats are cold sawed to length and on no occasion sheared. They are manufactured to a size tolerance of plus nothing minus .008" in all cases.

Surveys conducted in many Industrial Plants have definitely shown that there is a real saving thru the use of Cold Drawn Extra Wide Flats. On your next order of steel involving any of the above applications, may we invite your attention to the B&L Product.

Bliss & Laughlin, Inc.

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Structural Shapes

Structural Shape Prices, Page 50

New York—Demand for structural material improves slowly. Public works, including a growing number of small state bridges, provides the largest outlet. For the country as a whole, the American Institute of Steel Construction Inc. reports September bookings approximately 30 per cent under the previous month, with shipments nearly 20 per cent less. The 76 companies reporting, representing 62 per cent of the industry, booked 38,692 tons and shipped 40,375 tons last month.

Pittsburgh—Public works programs are slow to benefit structural fabricators. Dravo Contracting Co. is low on the Gallipolis, O., parallel locks in the Ohio river requiring 2500 tons of fabricated structural steel, and the same company will probably fabricate about 1200 tons for the Winfield, W. Va., locks, although there is some dispute over the general contract award. Plain structural material is firm at 1.70c base, Pittsburgh.

Cleveland—Federal-aid road and bridge projects in Ohio are being advertised for bids with greater frequency, but several weeks elapse between the time general contractors are notified of awards and when their contracts are actually approved at Washington and signed. A substantial industrial building project at Toledo has been postponed pending further business improvement. Plain material now is on the single base of 1.60c, Pittsburgh.

Chicago—Structural awards and inquiries are lighter, with public bridge and river lock work predominating. Decision to use stone instead of steel for the Indiana Harbor, Ind., breakwater removes 2700 tons of piling from the market. Bids open this week on the Mississippi river lock at Muscatine, Iowa, requiring 2000 tons of piling, with bids on other units scheduled later. Awards are small, consisting principally of 1500 tons for state bridges. Bids open Nov. 6 on the Kansas City, Mo., auditorium, taking 5000 tons. Piling will be advanced $2 a ton Nov. 1 to 2.10c, Chicago. Plain shapes continue 1.75c, Chicago.

Boston—Boston Bridge Works Inc., is low for furnishing, fabricating and erecting four bridge superstructures, East Boston-Revere, Mass., taking close to 900 tons, at $70,379.88. Inquiry for structural steel holds the recent gains.

Philadelphia—Featuring structural inquiry is 1000 tons for a high school in Wilmington, Del., on which bids will be opened Nov. 15. Substantial requirements will be specified soon for an airport development for the United States engineers, Middletown, Pa., which will include machine shops and hangars. Shapes are unchanged at 1.80c, Bethlehem, Pa., or 1.90½c, Philadelphia.

Contracts Placed

1200 tons, Winfield locks, Winfield, W. Va., to Dravo Contracting Co., Neville Island, Pittsburgh.

900 tons, four bridge superstructures, state department of public works, East Boston and Revere, Mass., to Boston Bridge Works Inc., Cambridge, Mass.

810 tons, four hangars, Corry Field, Pensacola, Fla., to Ingalls Iron Works Co., Birmingham, Ala.

750 tons, bridge, Jackson county, Missouri, to Kansas City Structural Steel Co., Kansas City, Mo.

730 tons, bridge, Leeds, Mo., to Kansas City Structural Steel Co., Kansas City, Mo.

350 tons, overhead bridge, New London, Wis., to Wisconsin Bridge & Iron Co., Milwaukee.

209 tons, highway bridge, Lisbon, N. H., to McClintic-Marshall Corp., Bethlehem, Pa.

200 tons, bridge, Richardson county, Nebraska, to St. Joseph Structural Steel Co., St. Joseph, Mo.

170 tons, bridges, Missouri, to St. Joseph Structural Steel Co., St. Joseph, Mo.

150 tons, bridge, Garner, Iowa, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

150 tons, bridge, Independence, Wis., to Worden-Allen Co., Milwaukee.

130 tons, bridges, Iowa, to Clinton Bridge Works, Clinton, Iowa.

125 tons, stadium footbridge, Cleveland, to McClintic-Marshall Corp., Bethlehem, Pa.

125 tons, bridge, Gregory, Mo., for Chicago, Burlington & Quincy railroad, to American Bridge Co., Pittsburgh.

123 tons, state bridge over Feather river, Plumas county, California, to Virginia Bridge & Iron Co., Roanoke, Va.

110 tons, bridge for Alaska road commission, to Wallace Bridge & Structural Co., Seattle.

100 tons, beam spans, department of agriculture for various points, to Guibert Steel Co. and American Bridge Co., Pittsburgh; bids closed Oct. 17 on 21 additional spans, various delivery points.

Shape Awards Compared

	Tons
Week ended Oct. 21	**6,332**
Week ended Oct. 14	**15,486**
Week ended Oct. 7	**14,984**
This week in 1932	**90,263**
Weekly average, 1932	**14,285**
Weekly average, 1933	**14,102**
Weekly average, Sept.	**14,365**
Total to date, 1932	**719,833**
Total to date, 1933	**606,385**

Contracts Pending

4000 tons, federal building, San Francisco; bids Nov. 7.

3600 tons, machine shop Puget Sound, Wash., navy yard; general contract awarded to K. E. Parker, San Francisco; McClintic-Marshall Corp., Chicago, reported low on structurals.

2500 tons, two parallel locks in the Ohio river below Gallipolis, O.; Dravo Contracting Co., Neville Island, Pittsburgh, low on general contract.

2000 tons, piling, Mississippi river lock No. 16, Muscatine, Iowa; bids Oct. 24, to United States engineer, Rock Island, Ill.

1800 tons, Rockland state hospital, Orangeburg, N. Y.; revised inquiry.

1000 tons, piling, breakwater, Port Washington, Wis.; bids Nov. 1.

1000 tons, postoffice, Des Moines, Iowa; Lagura Construction Co., Gary, Ind., low on general contract.

1000 tons, high school, Wilmington, Del., bids Nov. 15; an unstated tonnage of reinforcing bars also will be required.

658 tons, state overhead crossing, San Bernardino county, California; general contract to J. E. Knapp.

500 tons, building, Alpine Brewing Co., Jersey City, N. J.

500 tons, radio towers, various locations, for department of agriculture, Washington.

458 tons, Soto street bridge over Ramona boulevard, Los Angeles; bids Oct. 25.

400 tons, brewery, San Francisco; Western Iron Works, San Francisco, low.

325 tons, highway bridge, Oneonta, N. Y.

320 tons, state bridges, New York; bids at Albany Oct. 31.

300 tons, highway bridge, Cloquet, Minn.

300 tons, overhead crane structures, navy yard, Brooklyn, N. Y., Orton Crane & Shovel Co., Chicago, low.

300 tons, four 300-ton and one 50-ton crane; specification 549, for Boulder dam, Boulder, Nev.; bids Nov. 17.

250 tons, highway bridge, Belmont, N. Y.

202 tons, emergency dam stoplogs, needle dams and two stiff-leg derricks, one 50 and one 15-ton, Harvey lock, Louisiana-Texas intracoastal waterway, Harvey, La., Nashville Bridge Co., Nashville, Tenn., low, $72,903. Bids Oct. 5.

200 tons, stock house, Gottfried Brewing Co., Newark, N. J.

190 tons, beam spans, various locations, for department of agriculture, Washington.

100 tons, postoffice, Waltham, Mass.; V. & M. Construction Co., New Rochelle, N. Y., low on supplementary bids, Oct. 10.

100 tons, postoffice, Asbury Park, N. J.; supplementary bids in.

100 tons, piling, Barnegat, N. J., lighthouse; bids Oct. 23.

Unstated tonnage, $1,640,976 airport development for the United States engineers, Middletown, Pa.; steel requirements will be heavy.

Unstated tonnage, $187,000 marine hospital, Portland, Me., R. W. Erickson, Philadelphia, awarded general contract.

Concrete Bars

Reinforcing Bar Prices, Page 51

New York—Close to 8000 tons of highway mesh has been placed by contractors for New York state projects in recent weeks, and about 1000 tons remains to be placed for projects on which bids are in. New inquiry, however, is less active. Billet and rail steel reinforcing bars have shared to a lesser extent in the improvement. Prices on both are unchanged.

Pittsburgh—The fourth Pennsylvania state highway letting of the month closes at Harrisburg, Oct. 27. Two reinforced concrete bridges in Bradford county take 40 tons of plain steel bars but an unstated, though much larger, tonnage of mesh and bars is required for concrete pavement. Base prices are firm; on new billet steel, 1.80c, Pittsburgh, is quoted; and on rail steel, 1.75c, Pittsburgh.

Cleveland—The state highway department is taking bids Oct. 27 on road and bridge work requiring approximately 100 tons of concrete bars and 100 tons of structural shapes. The general market is quiet.

Chicago—New business in reinforcing bars is slow despite fairly large tonnages in prospect for several public works projects. Private construction continues quiet, practically all of recent orders being for lots of less than 50 tons. Orders for work by the Chicago sanitary district were placed prior to the postponement occasioned by lack of funds, but have been released by a federal loan.

Boston—For highways and bridges, approximately 600 tons pend. Contractors have placed 175 tons for Connecticut work, mainly mesh. Maine has bought reinforcing steel requirements from the Portland, Me., mill. Billet bars are steady at 1.95c, Buffalo, cut lengths.

Philadelphia—Except for approximately 500 tons of Pennsylvania state road work and 200 tons of New Jersey work, reinforcing bar demand remains quiet. With the bar distributors' code scheduled for formal hearing in Washington, Oct. 23, and the general adoption of the code likely to follow shortly thereafter, distributors' prices are expected to show greater firmness in the near future.

Concrete Awards Compared

	Tons
Week ended Oct. 21	1,043
Week ended Oct. 14	6,965
Week ended Oct. 7	7,516
This week, 1932	10,237
Weekly average, 1932	3,920
Weekly average, 1933	3,552
Weekly average, Sept.	3,365
Total to date, 1932	184,147
Total to date, 1933	152,759

Contracts Placed

800 tons, two jobs in Los Angeles, to Jones & Laughlin Steel Corp., Pittsburgh.

370 tons, rail steel bars, substructures, Grand Island bridges, Buffalo, to Kalman Steel Corp., Bethlehem, Pa.; through Booth & Flinn, Pittsburgh.

268 tons, bars, railing and piling, overpass, International & Great Northern railroad and Sabine river bridges,

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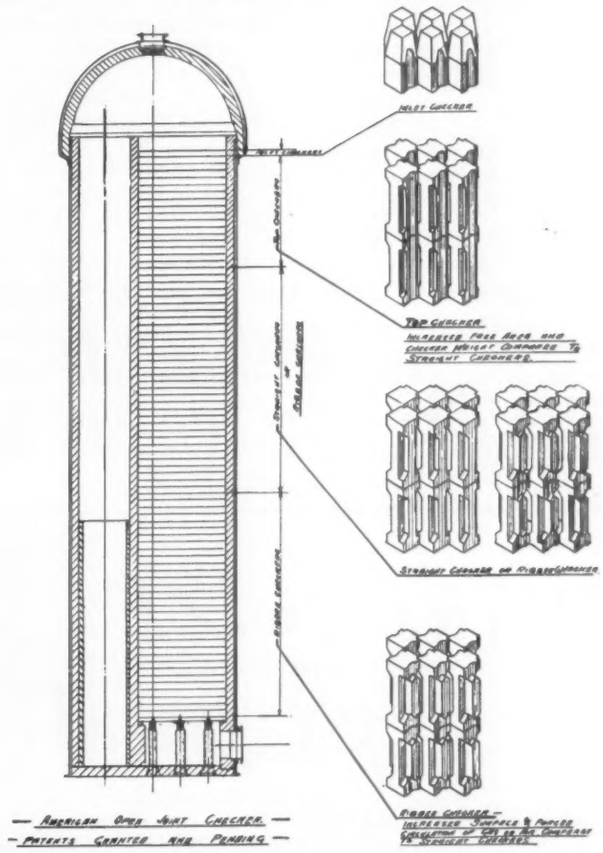

The American Open Joint Checker has great structural strength and the necessary weight where needed.

Complete cross-circulation with no horizontal surfaces; channeling and dead flues eliminated.

With the open joints, the protruding ribs act as a mechanical means to force cross-circulation and impingement of gases on all brick surfaces.

Maximum heating surface per cubic foot of volume.

Minimum cost per square foot of heating surface.

William M. Bailey Company
Pittsburgh — Pennsylvania

Gregg county, Texas, to unstated fabricator; Buckner Bros., Cleburne, Tex., general contractors.

200 tons, mesh, highway, New York state, including 125 tons, Ontario county, to American Steel & Wire Co., New York; Bolton, Suits, Bolton & Gibbs, Watkins Glen, N. Y., general contractor.

150 tons, reinforced concrete water system reservoir, Manchester, N. H., to Concrete Steel Co., Boston; C. & R. Construction Co., Boston, general contractor.

145 tons, bureau of roads and bridge, Lewis county, Washington, to unnamed eastern interest; Western Construction Co., Seattle, general contractor.

105 tons, highway work in Coconino county, Arizona, for bureau of public roads, to unnamed interest.

104 tons, Carmel river bridge, Monterey county, California, to Concrete Engineering Co., San Francisco.

101 tons, state bridge in Eagle county, Colorado, to unnamed interest.

Contracts Pending

2400 tons, pier, quays and repair basin, Pearl Harbor, T. H.; bids Nov. 15.

1695 tons, White Point outfall sewer, Los Angeles. Los Angeles County Sanitation District No. 5 has applied for $2,820,000 NRA funds.

1000 tons, estimated, mesh in 166,000 square yards, Pennsylvania state highways; bids Nov. 2.

450 tons, two parallel locks in the Ohio river below Gallipolis, O.; Dravo Contracting Co., Neville Island, Pittsburgh, low on general contract.

425 tons, reservoir roof for Glendale, Calif; bids Oct. 26.

375 tons, bridge substructures and approaches, East Boston and Revere, Mass.; Simpson Bros. Corp., Boston, low on general contract, $574,102.35.

198 tons, Soto street bridge over Ramona boulevard, Los Angeles; bids Oct. 25.

177 tons, state highway work, Santa Clara county, California; bids Nov. 1.

134 tons, Montgomery, Ward & Co. building, Eureka, Calif.; bids rejected and plans to be revised.

125 tons, Main street bridge over Chartiers creek, Carnegie, Pa.; John E. Kunz Co., Pittsburgh, general contractor.

105 tons, state bridge over Santa Ana river, Orange county, California; bids Nov. 1.

Railroad

Track Material Prices, Page 51

While not officially announced it is reported railmakers have offered a price of $38 per gross ton for standard steel rails in response to the administration's request for a lower price in view of the heavy tonnage the carriers are ready to buy in case the price is attractive. This figure is not as low as suggested by Coordinator Eastman, who indicated $35 or less as a working basis.

Bids of $40, mill, were submitted by all bidders on the 10,000 tons of rails for Norfolk & Western, opened Oct. 18. This is the unchanged price that has prevailed for some time. It is reported 7500 tons were awarded Carnegie Steel Co., Pittsburgh, and 2500 tons to Bethlehem Steel Co., Bethlehem, Pa. However, it is believed definite award will await a definite price under the present effort of the administration to obtain a lower figure. These bids were in response to an inquiry issued before the request for revision of prices and were made under the Clayton act. No discussion has occurred on prices for track fastenings and these probably will not be taken up until the rail price has been settled.

Rolling has been completed by the Edgar Thomson mill of Carnegie Steel Co., Braddock, Pa., on some 24,000 tons of rails and fastenings for export to Brazil. Dominion Iron & Steel Co., Sydney, N. S., has started rolling an order for 36,000 tons of rails for the Canadian National, sufficient to keep the mill in operation to the end of the year. The order was placed some time ago.

Strip

Strip Prices, Page 51

Pittsburgh—Many third quarter contracts, shipments on which were not completed by early last week or the Oct. 16 deadline have been filed in duplicate, as the steel code provides. Strip steel manufacturers still are shipping rather heavily but incoming business is practically absent. Not much improvement in new buying is expected for at least another month. Prices now quoted firmly are 1.75c base, Pittsburgh, on hot-rolled strip and 2.40c, Pittsburgh, or Cleveland, on cold-rolled strip.

Chicago—Strip demand is lighter, following heavy shipments over recent weeks in closing old contracts. Only small opposition has arisen against the sharp increase in cold strip prices and new business is being taken at 2.40c, Pittsburgh-Cleveland, base. Specifications against new contracts are light. Hot-rolled strip continues 1.85c.

Cleveland—Few orders have been placed at the new prices for fourth quarter, due to the fact consumers acquired stocks on third quarter contract shipments prior to Oct. 15. Sales during the week for some leading producers were as quiet as last March.

Boston—With completion of shipments of most lower-priced cold-rolled strip, mills are now rolling tonnage taken at 2.60c, Worcester. Buying has slowed and some consumers have stocked rather heavily. Reduction of backlogs is beginning to reduce production.

New York—Cold-rolled strip consumers appear well covered on their nearby requirements, which limits demand for hot strip as cold rollers are not buying. Hot strip is 2.08c, New York, and cold 2.73c.

Philadelphia—Buying of strip is

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IN STANDARD AND SPECIAL ANALYSES

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HARRISBURG, PA.

spotty, with sellers generally reporting a further decline. Radio manufacturers are taking far under normal requirements, although consuming slightly more than a year ago, it is said. Hot strip is 2.04c, Philadelphia, and cold strip, 2.69c, Philadelphia.

Wire

Wire Prices, Page 51

Pittsburgh—The wire market is weak from the standpoint of buying, but firm as far as prices are concerned. Pittsburgh bases of $2.10 per keg on nails, 2.10c on plain wire and 3.10c on spring wire continue to be quoted. Usual October rural demand for merchant wire products is disappointing. The manufacturing trade is well stocked.

Cleveland—Mills are catching up on orders as sales and shipments in this district have tapered. Plain manufacturers wire is firm at 2.10c, and nails $2.10.

Chicago—Some hesitation has developed in the wire market and although new business is improving, specifications are lighter. Automotive interests defer placing new orders and demand for wire products in farm districts is slow. General consumption of manufacturers' wire has moderated from the summer peak. New business is booked at $2.15 for wire nails and 2.15c for plain wire.

Boston—Wire mill operations in several departments are lower. Most consumers have covered through the next few weeks and new buying is slower. Plain wire is steady at 2.20c, Worcester.

Wire prices filed by New England mills include quotations on a long list of specialty wires and standard products. Most New England producers have filed schedules with the American Iron and Steel institute, but not all. These, however, are reported to be in line. Some prices, other than plain bright or manufacturers' wire at 2.20c, Worcester, and spring wire at 3.20c. Worcester, are:

	Base, Worcester
High carbon steel wire	3.70c
Tinned mattress wire	5.35c
Tinned or coppered broom wire	5.10c
Heddle wire	9.65c
Brush wire, tempered flat	7.10c
Brush wire, tempered round	11.75c
Brush wire, untempered round	10.85c
Tag wire	3.80c
Cast steel rope	4.25c
Plow steel wire rope	4.75c
Improved plow steel wire rope	5.25c
Screw stock (Buffalo)	2.00c
Weaving wire	3.80c

New York—Manufacturers' requirements of wire have slowed. Nails are 2.10c, Pittsburgh, per 100-pound keg, and plain wire 2.10c.

Bolts and Nuts

Bolt, Nut, Rivet Prices, Page 51

Effective early last week all noncontract buyers of bolts, nuts and rivets were advised of an advanced schedule effective as of Oct. 16. Contract customers, who had been granted protection through October only, were advised the price would apply from Nov. 1 to the end of the year. The advanced schedule now quoted is: 70 off list for bolts and nuts; 70 and 10 off for small rivets; 2.75c base per 100 pounds, Pittsburgh or Cleveland, for large rivets, or 2.85c, Chicago and Birmingham, Ala. The effect is to make contract buyers specify fully against October contracts. However, shipments on these must be completed by Nov. 15. Step and elevator bolts have been increased four points to 66 off list. Tire bolts are up ten points to 60 off list now. Package lots of stove bolts at 72½-25-10 off are unchanged, as are bulk lots of 5000 or more of a size at 85 off list. Hot-galvanized bolts are 55 off alloy steel bolts, 65 and 10; finished case-hardened nuts, 75 off; master mechanic slotted nuts, 70 off; stove rods, ¼-inch and larger, 6.50c and 3/16-inch and smaller, 7.50c.

Cold Finished

Cold Finished Prices, Page 51

Pittsburgh—Important buyers of cold-finished steel remain out of the market due, in the case of jobbers and automobile manufacturers, to heavy stocks of bars. No change in the present market of 1.95c, Pittsburgh, has been made. Other bases on cold-finished steel are also holding at 2.00c, Cleveland, Buffalo or Chicago; 2.15c, Detroit; or 2.20c, Eastern Michigan.

The bureau of internal revenue has announced a refund to the Republic Iron & Steel Co. (now the Republic Steel Corp) amounting to $43,128.64 for overassessment of income tax for 1927.

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Pig Iron

Pig Iron Prices, Page 52

Pittsburgh—Foundry melt continues below a month ago but demand for ingot molds has picked up, at least temporarily. Unchanged prices of $18, Neville Island, base on foundry grades and $18.50 on bessemer pig iron rule firm and unchanged, but a price advance is seen as inevitable, probably for the first quarter of 1934, in view of the stiff advance in furnace coke. A contributing factor to the slack demand for pig iron from foundries in this district, as well as from several nonintegrated steel producers, is the inclusion of heavy breakable cast scrap in the melt. Heavy breakable cast available today at around $11.50, obviously contrasts sharply with an $18 pig iron market. Shenango Furnace Co. blew out its Sharpsville, Pa., furnace last week, active since February.

Cleveland—Sales improved during the week, a merchant furnace interest here booking 4000 tons, nearly double the amount of the preceding week. The automotive industry did not figure conspicuously in this buying. More inquiries also appeared, though sales and inquiries are for small lots. Price advances are not contemplated at this time by producers here, despite increased fuel costs, though a revision is anticipated later this year. Ford Motor Co. has not closed on its informal inquiry for 10,000 tons of basic iron, and in some quarters it is believed now that the inquiry was merely a "feeler" in developing comparative costs of steel which might be made by the company, and that which might be purchased.

Chicago—New business consists of occasional orders for single carloads or a few hundred tons at a time. Shipments are fairly steady and the movement is expected to vary but little over the balance of the year, in view of unfilled tonnage on sellers' books. Foundry operations are moderately lower and there is some fear that iron now moving to stocks will restrain new buying on the opening of first quarter books Dec. 1. Automotive requirements are lighter and consumption by farm implement interests is slow to improve despite the better outlook in this industry. The market continues $17.50, furnace, for No. 2 foundry and malleable.

Boston—Sales are light and in small lots. Most consumers are covered throughout this quarter. Books are not open for first quarter. Dutch iron is firmer and selling more in line with domestic prices. About 700 tons of Indian iron recently arrived.

New York—Interest is focused on the inquiry for 1800 tons of foundry iron for upstate plants of the General Electric Co. Contracting is slightly better and prices are unchanged with weakness in scrap offsetting the buoyancy imparted by higher quotations on coke.

Philadelphia — Eastern Pennsylvania sellers figure to have little chance in supplying some 15,000 tons of pig iron required for the 25,000 tons of 48-inch cast iron pipe for Mexico City, even should the contract be awarded to a domestic pipemaker. The pipe is held too large for eastern shops to transport economically to Mexico City. Under Resolution No. 26, recently put into effect by the American Iron and Steel institute, domestic pig iron producers were permitted to offer pipemakers concessions to enable them to compete on this export business. Demand generally in this district is light. The sharp increases in coke prices may have a stimulating effect on buying later but, meanwhile, consumers are content to study the situation, particularly in its relation to increasingly soft scrap prices.

Buffalo — Demand has dropped sharply, sales and inquiry being confined largely to single-car lots. A fairly large tonnage of iron still is to be shipped by barge canal before the close of navigation, and good inquiry exists for barges to carry this metal.

Cincinnati—Fresh orders are extremely light although shipments continue in fair volume. The attitude of consumers toward buying now indicates adequate inventories for this quarter at the slowly decreasing melt.

St. Louis—Melt in the stove manufacturing industry has held up well, but elsewhere a recession is noted. New orders for pig iron continue of the spot variety although shipments still are heavy. Prices are unchanged.

Birmingham, Ala.—Sales continue light. Following the blowing out of the Woodward Iron Co.'s blast furnace at Woodward, Ala., last week, the Tennessee Coal, Iron & Railroad Co. has banked one of its larger blast furnaces at Fairfield.

Toronto, Ont.—While no special interest has developed recently merchant sales are holding at a steady level. Melters are taking supplies as demands dictate.

Renfrew Machinery Co., Renfrew, Ont., has reopened its plant for the manufacture of cream separators, stoves and washers, after a long shutdown, with about 75 workmen employed.

Coke

Coke Prices, Page 52

Foundries remain out of the market on metallurgical grades, and $4.25 on common foundry grades and $5.25 on premium brands have not been adequately tested. The standard furnace coke market at $3.75, ovens, is reflecting a similar condition. Resumption of operations has been gradual in the coal mining and Connellsville coke industries.

While asking substantially higher prices, eastern sellers of metallurgical beehive coke can not yet offer definite shipments. Foundry consumers are operating at a continued low rate and pressure for coke from by-product producers in the East has not been great.

Iron Ore

Iron Ore Prices, Page 52

Cleveland—Consumption of Lake Superior iron ore dropped a half million tons in September from August, according to the Lake Superior Iron Ore association. Stocks at lower lake ports and furnaces Oct. 1, however, were 1,125,547 tons less than on the comparable date last year. The report:

	Tons
Consumed in August	2,611,903
Consumed in September	2,102,076
Decrease in September	509,827
Consumed in September, 1932	697,185
On hand at furnaces, Oct. 1, 1933	28,415,502
On Lake Erie docks Oct. 1, 1933	5,033,573
Total at furnaces and Lake Erie docks Oct. 1, 1933	33,449,075
Total Oct. 1, 1932	32,323,528

Ferroalloys

Ferroalloy Prices, Page 52

Specifications for ferromanganese have declined. Prices, however, are unchanged at $82, eastern seaboard, on car lot shipments. Domestic spiegeleisen, 19 to 21 per cent, is featureless at $27 furnace, spot shipment.

New York—Only one important domestic tungsten user has covered for its forward requirements of this metal. Others still are using up stocks which they have carried over from 1929. Due

to increasing production of high speed tool steel, consumption of tungsten is at a more rapid rate, so that stocks still in consumers' hands are expected to be used up during the next six to nine months. Tungsten ore, for instance, dropped from a duty unpaid level of $9 a unit in 1929, to $1.25 at which level it remained from October, 1932, until May this year. In May the market rose to $2, followed by advances to $3.25 in June, $4 in August, and $5.50 in September and early October.

Warehouse

Warehouse Prices, Page 54

Pittsburgh—In addition to the advances of $2 and $3 a ton on hot-rolled bars, plates and shapes announced last week, jobbers of 10 gage hot-rolled and 24 gage hot-rolled annealed sheets have adopted changes. These products are now sold on the quantity differential plan with 400 to 3999-pound lots base, instead of the former method of differentials for number of bundles. The bundle method of selling has been retained, however, in galvanized sheets, although here an advance of $4 a ton has been announced. Other new prices here are: forging bars, 3.15c; plain concrete bars, 3.00c; twisted square concrete bars, 3.15c; special threading rounds, 2.95c; high-carbon plates, 3.45c; copper-bearing plates, 3.30c; spikes, $2.90 for 1 to 24 keg lots. Cold-finished remains 3.20c. All warehouse steel prices are quoted 10 cents less than the above for delivery outside of Pittsburgh. Demand for warehouse steel is falling but several orders in the largest quantity bracket, 20 tons, have been placed here recently. Obviously this type of order, 60 cents under base, has been sizable but unattractive to the jobber.

Cleveland—Advances in warehouse prices which went into effect during the week range from $3 a ton on commercial steel bars to $5.20 on plates and shapes, and $10.20 on sheets, for delivery in Cleveland. Cold-finished steel and cold-rolled strip were not changed. The new prices have received little test, as business is quiet.

New York—Most steel products out of warehouse have advanced with the application of new policy by which prices are quoted f.o.b. mill, with spread between mill and warehouse prices added, plus less car lot freight to destination. Shapes, plates and bars, hoops and bands are among those advanced. Blue annealed sheets, not included in the new quantity brackets are now 3.17c, base, New York warehouse. The new quantity brackets are: 399 pounds and under, 50 cents per 100 pounds over base; 400 to 9999 pounds, base; 10,000 to 19,999 pounds, 15 cents under; 20,000 to 39,999 pounds, 25 cents under; 40,000 pounds and over, 35 cents under base.

Chicago—Sales are steady and prospect for improvement in the October volume is rather favorable. Prices are unchanged following extensive revisions, although some increase in bolts and nuts is anticipated as a result of the advance in mill prices.

Boston—An early change in bar prices out of warehouse is expected, probably this week, with the likelihood of advances on other items shortly. Volume holds well, notably on sheets.

Philadelphia—Galvanized sheets from warehouse have been advanced $5 a ton to 4.00c, and No. 24 box annealed sheets, $2 a ton to 3.40c. The sharp increase in galvanized sheets follows particularly unsettled conditions. Jobbers here have not yet adopted the sweeping changes in methods of quoting now applied in some other districts. Trading is light.

Detroit—Warehouse business in Detroit holds at about the September level. A few tool and die shops are operating on a partial basis and a little more demand has originated in this quarter. Delivered prices are now in effect in every city, they being the base of the nearest mill, plus less-carload freight, plus the warehouse differential. Prices quoted for Detroit are for delivery within the metropolitan district.

Cincinnati—New warehouse prices are effective but quantity differentials are unchanged. Pittsburgh mill basing prices are used to obtain local prices by addition of the warehouse differential and freight rate.

St. Louis—Iron and steel warehouses have put into effect the expected advance on important commodities to conform with higher mill schedules and other conditions. Business during the past week or ten days shows signs of declining in volume. The size of individual orders is growing smaller.

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Scrap

Scrap Prices, Page 54

Pittsburgh—A six-week deadlock was broken last mid-week when a district sheet mill purchased something over 5000 tons of heavy melting railroad scrap, paying $12.50 per ton delivered. This purchase affirms an unchanged No. 1 heavy melting steel market here, quoted $12 to $12.50 taking into consideration the usual premium on railroad scrap. In the elapsed six weeks the market had lost ground to the extent of $1.50 a ton through scaling down on brokers' unsuccessful offers to sell. Blast furnace scrap is without takers at $8 to $8.50 and machine shop turnings are listless at $9 to $9.50. Specialties are between $14 and $14.50. A district mill recently began to receive shipments on a 4000-ton order for No. 2 bundles, the order at $10.50 having been placed about a month ago. The scrap, originating at Racine, Wis., was shipped down the lakes, thence by rail from a lower lake port.

Cleveland—Some tightening in distribution of iron and steel scrap is noticeable, with several important consumers in the Youngstown district holding up shipments. Heavy steel lines have not shown further activity, although expectations are held that before the end of the month some mills may be forced to make some tonnage purchases. Prices are weaker.

Chicago—Scrap prices have declined 25 cents to $1 a ton. Small sales of heavy melting steel have been made at $9.50, a decrease of 25 cents, and while a test is lacking in some grades, quotations are nominally lower. Most mills continue out of the market, and offerings are heavier in some directions. One railroad has disposed of several thousand tons on which previous bids at higher prices had been rejected.

Boston—All grades of scrap are dull with prices barely steady. Weakness is still evident on some, notably chemical borings. Buying is absent and shipments against a few orders are slack. Although the largest New England steel works is operating heavily on scrap it has a large supply. For No. 1 heavy melting steel $7.75, Worcester, is about the best on dribbling business.

New York—Heavy melting steel scrap is off 50 cents, dealers now paying $7.50 for No. 1 barge, and $6.50 for No. 2. Activity is confined largely to buying against export orders with shipments light to eastern steel works. A few water shipments continue to Buffalo as navigation approaches an end. Rails for rolling are easier. There is practically no call for borings and turnings.

Philadelphia — Scrap prices continue to sag under dull demand. No. 1 heavy melting steel is now $10, delivered, compared with $10 to $10.50, recently. Incidentally, there has been further small buying at $10 by a local consumer. Blast furnace borings and turnings are down 50 cents a ton to $5.50 to $6, delivered; hydraulic bundles off similarly to $9.50 to $10 and machine shop turnings down to a flat $6.50, as against $6.50 to $7. No. 1 railroad wrought is nominally lower at $10.50, delivered.

Buffalo—There is no activity in scrap. Mills are not buying in spite of absence of orders on dealers' books. Prices are nominal.

Detroit—A number of grades have declined 25 to 50 cents a ton further, putting heavy melting steel and hydraulic compressed sheets on the basis of $7 to $7.50. Offerings of scrap are declining, but so is demand. Following its recent purchase, the local mill is out of the market.

Cincinnati—Absence of consumer buying has caused another strain on iron and steel scrap prices which are revised downward. Another weakening factor was declining melt.

St. Louis — After remaining unchanged for a month or six weeks, iron and steel scrap quotations have been reduced 25 cents to $1 per ton. The reductions were mainly adjustments with other centers. Markdowns were made on about 15 grades, among them heavy melting steel, malleable, cast, steel rails, old iron car wheels, blast furnace material, and rails for rolling.

Birmingham, Ala.—Iron and steel scrap is at a standstill with prices nominal and unchanged. Most melters have sufficient stock for current needs and dealers are well supplied.

Toronto, Ont.—With export demand decreasing sales of steel scrap are declining. It is stated that another shipment or two will be made before navigation closes, but no additional business is in sight. Canadian mills are not placing orders with dealers for steel scrap although some are buying railway accumulations. Iron grades have a steady call in small lots. Prices are unchanged.

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Cincinnati Pittsburgh Buffalo

Semifinished Steel

Semifinished Prices, Page 52

Tin mills continue to make the heaviest calls upon semifinished producers, and sheet bar shipments from the Pittsburgh district have picked up since the advance in tin plate operations there to around 95 per cent. If tin plate prices are advanced to the extent rumored, sheet bars also may be raised. In the meantime billets, slabs and sheet bars are $26, Pittsburgh. Wire rods hold at $35, and forging billets at $31. Skelp remains 1.60c, Pittsburgh.

Metals

Nonferrous Metal Prices, Page 51, 54

New York—Further price easiness and general unsettlement developed in the nonferrous metals last week. Contributing factors were slower demand and the revelation of a renewed uptrend in some metal stocks accompanied by a general decline in commodity and security values.

Copper—Electrolytic metal could be had from custom smelters at 7.50c, Connecticut, although some were asking 7.62½c. The 7½-cent level represented a drop of 1½ cents from the recent high and the lowest price since last May. Near the close of the week, the price decline appeared to be at least temporarily halted. The price cutting was initiated by the custom smelters following a heavy influx of scrap which was not offset by a proportionate gain in demand for refined copper. Some relief to this situation has resulted as foreign prices have been somewhat higher than domestic and scrap again is moving abroad. World stocks of copper fell 14,500 tons in September but domestic deliveries shrunk by 10,000 tons.

Lead—The New York price fell $10 a ton last week to 4.00c per pound, the lowest level in about five months. The midwestern level eased to 3.90c. This decline followed continued slack demand and a further easing in foreign prices which threatened to permit the diversion of foreign ore to this country. Domestic lead stocks jumped 5794 tons in September after falling in the preceding three months.

Zinc—Little interest on the part of consumers was apparent and offerings came into the market at under the 4.75c, East St. Louis, figure which had been prevailing for several weeks.

Tin—Light to fair business was reported early in the week but later dwindled as prices dropped due to lower prices abroad and easiness in sterling exchange. Tin plate consumers are relatively heavy consumers in this country.

Aluminum—Virgin prices were unchanged but remelt grades showed less strength.

Coke By-Products

Coke By-Product Prices, Page 52

New York—Naphthalene has been advanced 6.00c to 7.25c, for both flakes and balls. The lower figure is for larger contract business. This covers business for next season delivery, as well as the remainder of the year. Distillates are firm and unchanged. Sulphate of ammonia prices probably will remain unchanged through December.

Quicksilver

New York — Quicksilver prices are nominally unchanged here, and the market quiet. Round lots are $66 to $67, a virgin flask of 76 pounds, with small lots 50 cents higher.

Sheet Piling

Sheet Piling Prices, Page 51

New York—Steel sheet piling has been advanced $2 a ton, effective Oct. 28, to 2.00c, Pittsburgh, and 2.10c, Chicago. Two producers filed higher quotations Oct. 18 with others expected to follow.

Engineer Projects Placed

International-Stacey Corp., Columbus, O., has booked contract for steel castings and iron rollers at $2371.75 for a United States engineer project, Huntington, W. Va., also for steel plates and straps at $2089. American Bridge Co., Pittsburgh, took angles and bearing straps for the same project at $871.03.

Locust Plague in Argentina Boon to Sheet Mill Workers

War on locusts in Argentina is requiring thousands of tons of sheets, which in turn is helping to give work to thousands of employes of the American Sheet & Tin Plate Co., at its Vandergrift, Pa., Guernsey (Cambridge, O.), and Gary, Ind., works.

At the Guernsey plant, idle for a year, full-time work is assured 1000 men for at least five weeks. The Argentine government recently placed an order for approximately 40,000 tons of sheets, one-third of which were booked by the American company, the remainder reported to have been purchased from foreign mills.

These sheets are 20 inches wide and 60 inches long and are thrown up in the form of a breastwork against advancing hordes of locusts. Argentina has found it necessary to purchase large quantities of sheets for this purpose, 46,000 tons having been booked by the American company in 1924, and similar tonnages having been acquired since then from various sources.

At a certain stage in the locust's development it can hop but cannot fly, and at this stage they are trapped in large pens, preventing their spreading and narrowing their field down to small areas where they may be destroyed more easily and operations be more concentrated.

1
Purch. Agent — Keep your shirt on, Pete, we'll keep you in steel.
Prod. Mgr. — Good morning, Charley, you'd better be laying in a good stock of steel soon; the factory sure is eating it up.
RYERSON STEEL - SERVICE

Pacific Coast

Pacific Coast Prices, Page 51, 52, 53

San Francisco—(*By Air Mail*)—Awards were exceptionally light the past week, less than 500 tons being placed. However, a number of new projects have just been released for figures and a heavy tonnage is noted in work about ready for release. Joslyn Co. of California took 2,435,000 feet of ½-inch extra galvanized ground wire for the Metropolitan water district, Los Angeles, and the Copperweld Steel Co., Glassport, Pa., received an order for 430,000 feet of copper-covered steel wire strand for the same district. Deliveries in both instances are from March to December, 1934.

Concrete Engineering Co. secured 105 tons of reinforcing bars for a bridge over Carmel river, Calif. Other reinforcing bar awards included 104 tons for highway work in Arizona and 101 tons for a bridge in Colorado, placed with unnamed interests. Bids will be opened Nov. 15 for 2400 tons, or more, for pier, quay walls and repair basin at Pearl Harbor, T. H. For the White Point outfall sewer, Los Angeles, on which the county has applied for NRA funds, 1695 tons of bars will be needed. Glendale, Calif., opens bids Oct. 26 for 425 tons for a reservoir roof. California will open bids Nov. 1 for highway projects calling for 285 tons.

Chicago Bridge & Iron Works, Chicago, is low on 150 tons of plates for a fuel tank for the naval base at San Diego, Calif. R. G. Mehler is low on 200 tons for three 250-horsepower boilers for the San Diego naval base. Prices hold at 2.25c, f.o.b. cars, Pacific docks. Los Angeles has opened bids on 289 tons of 14-gage black sheets for a 22-inch pipe line.

The only structural award of size went to Virginia Bridge & Iron Co. Inc., New York, and involved 123 tons for a bridge over Feather river in Plumas county, Calif. Bids will be opened Nov. 7 for 4000 tons for the federal building, San Francisco, and Oct. 25 for 458 tons for the Soto street bridge, Los Angeles. Over 300 tons are involved in five cranes for Boulder dam, bids Nov. 17. Western Iron Works is low on 400 tons for a brewery in San Francisco. Wide flange material holds at 2.35c, f.o.b. cars, dock, and standard shapes are 2.25c.

Beverly Hills, Calif., has taken bids on 110 tons of cast iron pipe. Hamilton Field, Calif., opened bids Oct. 16 for 200 tons. The White Point outfall sewer for Los Angeles, on which a NRA loan has been applied for, will require 4500 tons of 60-inch cast iron pipe.

Seattle Demand Improves

Seattle — The navy department has awarded to K. E. Parker, San Francisco, low bidder at $658,400, the general contract for the machine shop at the Puget sound navy yard, 3600 tons of structurals on which it is reported McClintic-Marshall Corp., Bethlehem, Pa., is low.

Alaska road commission, which called for bids for six bridges, has awarded one span to Wallace Bridge & Structural Steel Co., Seattle, 110 tons of shapes. Western Construction Co., Seattle, has let a subcontract for 145 tons reinforcing to an unnamed eastern plant. This material is for a Bureau of Roads bridge in Lewis county, Washington. United States Pipe & Foundry Co., through Hugh G. Purcell, Seattle, has booked 325 tons of cast iron pipe, government weights, for an improvement at the Puget sound navy yard. Award of 80 tons of cast iron for Ft. Lewis, Wash., is pending. Lewiston, Ida., is considering bids for about 200 tons of pipe and fittings, low bidders being Pacific States Cast Iron Pipe Co., Portland, Oreg., A. P. Smith Mfg. Co., for valves, and Chas. Hahn, Lewiston, for service fittings, etc.

Seattle has postponed until Nov. 2 bids for the seawall improvement, involving 800 tons cast iron pipe in addition to 6000 tons of steel sheet piling and reinforcing. Bids will be received Oct. 23 for 1145 feet of 36-inch and 2168 feet of 24-inch 5/16-gage water pipe, for Fifth avenue S. W.

Wholesale jobbers find business spotty, demand fluctuating from week to week. There is little mill buying, most of the turnover being out of stock. Sheets are fairly active. Conditions are improving, with a stable price level and no competition from foreign materials.

Japanese interests are willing to offer for steel scrap, rails being in best demand. This material is quoted at about $8 although exporters are offering only $7.50. Local mills are out of the market, being heavily stocked. The last of 21,000 tons of broad-gage railway equipment ordered by the Russian government in 1916 and since stored here and at Vancouver, B. C. is being moved to Japan, for melting. Dulien Steel Products Inc., New York, closed the deal. About 20 locomotives of this lot, rebuilt to standard gage, were sold to Chile.

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Purch. Agent. — Pete here is worried because the racks aren't full of steel.
Treas.—I'm glad they're not full. We've been thru three long lean years and must keep our capital liquid for the operation of the business.
RYERSON STEEL - SERVICE
(Continued on next page)

Steel in Europe

Foreign Steel Prices, Page 53

London—(*By Cable*)—A temporary lull in activities is following the recent large buying movement, with the undertone firm and the price tendency hardening. Middlesbrough

pig iron supplies are becoming insufficient and idle plant is awaiting increased coke supplies. Coke ovens are restarting in preparation for larger iron activities. Export trade volume is slightly improved, with prices low to meet foreign competition. Continental steel competition in the domestic market is increasing, without disturbing effect. Galvanized sheets are in fair demand and tin plate is much improved.

Both imports and exports for September show a gain. Imports in September were 80,342 tons, compared with 79,700 tons in August; exports were 157,367 tons, compared with 154,700 tons in August.

The Continent reports better inquiries from South America and structural sales to Great Britain. India is buying German structurals and bars, and Berlin reports special steel orders.

Equipment

Chicago—Demand for machinery and plant equipment is somewhat less active in some directions with sales still in better volume than during the corresponding period of last year. Although there are few instances in which purchases under active consideration have been deferred, buying and new inquiries generally are lighter. Machine tools are moving slowly with orders usually limited to individual items. Both railroads and steel plants are restricting purchases.

Pittsburgh—Builders of steel mill equipment find a continued quiet to the market with mills either deferring intended purchases or instead making repairs to existing units when required. Steel mill roll buying has been declining so far this month, with mills still averse to carrying spares.

New York—With inquiries out for more than 100 tools, bids on some of which are in, the navy department will close on several hundred thousand dollars worth of machinery shortly. This is a widely diversified list and holds the interest of dealers and builders, together with attractive business placed by automobile builders, a good part of which went to shops in the east and the Cincinnati district. A New York dealer sold ten machines for installation at the maintenance shop of a large radio broadcasting chain, and five for an oil company shop in Texas, including a large lathe, shaper, radial drill and other heavy equipment.

Boston—Inquiry for machinery is brisk and builders are figuring more volume, notably from the Detroit automobile territory which recently has placed some attractive orders. In the Worcester district, especially with grinding machinery builders. Textile mill equipment shops continue to operate actively. Ball bearing producers in some instances have stepped up operations. A Worcester district shop recently took eight machines for Russia to be used in airplane engine cylinder grinding.

Cleveland—Current agitation for some sort of stimulus to the capital good industries is heartening to builders of machinery and equipment. Buying continues slow with occasional spurts being registered. Report is heard that a large program of machinery buying, presumably to fit in with a changeover to independent springing, has been abandoned by the Chrysler Corp. It has been intimated that the corporation has definitely decided to give up the whole idea of independent springing as unsuitable.

Here and There In Industry

REPUBLIC STEEL CO., Youngstown, O., has appointed Stratton & Terstegge, Fifteenth and Main streets, Louisville, Ky., distributors of toncan copper molybdenum iron sheets. Warehouse stocks will be carried to meet immediate needs of the district.

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Sykes Metal Products Co., Logansport, Ind., has been placed in the hands of Fred McKinsey as receiver at the request of a creditor.

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Northern Equipment Co., Erie, Pa., has appointed C. J. Gaskell Co., Memphis, Tenn., its representative for the sale of its feed water heaters and other boiler equipment.

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Steel Kitchen Furniture Co., Waukegan, Ill., will move at once to Connersville, Ind., where it will occupy the building formerly used by the Indiana Lamp Co., where larger space is available.

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S. A. Woods Machine Co., Boston has appointed W. A. Martin, Portland, Oreg., its representative in that territory. The company's office and warehouse at Seattle will remain in charge of Harry Blake.

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Anderson Engine & Foundry Co., Anderson, Ind., E. W. Cooney, president and general manager, is meeting definite improvement in business. Demand for parts for diesel engines is increasing markedly.

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Ames Iron Works, Oswego, N. Y., has asked permission of Ben Wiles, referee in bankruptcy, to continue as a going concern to permit completion of orders for more than $100,000 worth of products, orders for which are in hand. Efforts are being made to effect

Prod. Mgr. — That's all right with me but you know it costs money to hold up production.
Purch. Agent—Yes, I know, and it costs money to carry steel on hand. As soon as it's in, you change the size or specification and the stock is obsolete.
We're hooked up with Ryerson for Immediate Service. They have the largest stocks in the country and can get steel over here almost as soon as you can truck it from your storerooms.
3
RYERSON STEEL - SERVICE

a reorganization to continue the works.

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Morden Frog & Crossing Works, W. Homer Hartz president, has moved its Chicago office to the entire twenty-seventh floor of the Willoughby Tower, No. 8 South Michigan avenue.

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H. A. Brassert & Co., Chicago, engineers and contractors, have received a contract from Alan Wood Steel Co., Philadelphia, for furnishing and erecting Brassert improved uptakes and downcomers for its No. 3 blast furnace at Conshohocken, Pa.

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Pack-Morin Inc., 261 Fifth avenue, New York, designer of automatic equipment, has been retained by the Tennessee Eastman Co., a subsidiary of the Eastman Kodak Co., Rochester, N. Y., to design special equipment pertaining to the products of the Eastman company.

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International Smelting Co., at its Toole, Utah, plant is experimenting with a beach sand from the shores of Salt Lake, the sand being composed of small round particles of calcium carbonate. It is thought that this will prove efficient in smelting operations, lessening the demand for quarried limestone.

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E. D. Coddington Mfg. Co., 5024 North Thirty-seventh street, Milwaukee, has sold the manufacturing rights and special automatic machinery for producing its paper-backed metal lath building fabric, known as Ecod, to the Reynolds Metal Co., New York. The Coddington company will continue to manufacture its line of building materials, including gypsum, colored plasters and cement paint. It will build several more of its special machines and will continue manufacture of the material for the Reynolds company and become its sales agent.

Men of Industry

(*Concluded from Page* 21)

signed to become vice president in charge of sales of the Hubbard Steel Foundry.

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Franz Boehm, Berlin representative for the Gleason Works, the Fellowes Gear Shaper Co. and the Brown & Sharpe Mfg. Co., sailed from New York Oct. 4, on the BREMEN after a visit of several weeks in this country.

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N. M. Gibson, field engineer for the Bethlehem Steel Co., has moved from Bethlehem, Pa., to Colorado Springs, Colo.

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H. Stanley Rogers, general manager and a director of Heppenstall Co., Pittsburgh, has resigned. He was associated with the company since 1923.

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B. R. Berthelson, formerly general mine foreman for the Consolidated Coppermines Co., Kimberley, Nev., has been appointed assistant mine superintendent for the Climax Molybdenum Co., Climax, Colo.

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W. K. Leach, formerly with General Alloys Co., Boston, is now associated with the American Manganese Steel Co., as general manager of the alloy division. He is located at the plant at 6600 Ridge avenue, St. Louis, where the company makes chromium-nickel castings for high temperature and corrosion-resisting applications.

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Rockwood N. Bullard has resigned as western sales manager of the Detroit Steel Products Co., to become associated with the Goodwin Corp., advertising and merchandising, 75 East Wacker drive, Chicago.

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George K. Hendrick, production manager; George S. Hendrickson, sales manager; and Albert F. Spitzglass, director of research of the Republic Flow Meters Co., Chicago, have been elected vice presidents.

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Wallace I. Cousins has been appointed representative for Louis Allis Co., manufacturer of motors, Milwaukee, in Delaware and District of Columbia, with headquarters at 4402 Kathland avenue, Baltimore.

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Herbert C. Ryding, retiring president of the Tennessee Coal, Iron & Railroad Co., and Robert Gregg, incoming president, were guests of hon or Oct. 13 at a dinner by the chamber of commerce of Birmingham, Ala.

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Ralph M. Trent has been appointed sales engineer in the Pittsburgh territory for the Pangborn Corp., Hagerstown, Md., manufacturer of sand blast and dust collecting equipment, with offices at 604 Chamber of Commerce building, Pittsburgh.

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M. H. Geisking, formerly manager of sales for the New Orleans district office of the Tennessee Coal, Iron & Railroad Co., and for the past two months assistant to the general manager of sales, has been elected vice president and general manager of sales, succeeding Robert Gregg, who as announced in STEEL, Oct. 16, has been elected president.

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William S. Knudsen, president and general manager, Chevrolet Motor Co., Detroit, has been appointed executive vice president of the General Motors Corp. He will be the chief executive officer of the corporation at Detroit, having general supervision over all car and body manufacturing operations in the United States and Canada.

M. E. Coyle, vice president and general auditor of the Chevrolet company, has been appointed general manager of the company.

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Edward M. Markham has been appointed by President Roosevelt as chief of army engineers to succeed Major General Lytle Brown, whose term expired Sept. 30. He will have the rank of major general. Since 1929, Colonel Markham has served as division engineer of the Great Lakes division, stationed at Cleveland. He will have charge of the engineering projects approved by the

RYERSON STEEL-SERVICE
stands for immediate shipment of everything in iron and steel
Following is a partial list of products:

Stainless Steel (Allegheny Metal)
Cold Finished Bars
Chrome Nickel & Other Alloys
Strip Steel
Sheets
Plates
Mild Steel Bars
Structurals
Copper
Brass
Tubes, Boiler & Mechanical
Welding Rod
Bolts
Rivets
Concrete Reinforcing Bars
Wire Mesh
Treads
Metal Working Tools

Shall We Send the Ryerson Stock List?

JOSEPH T. RYERSON & SON, INC.
Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City
④

army for the public works administration.

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H. P. MacGregor, 1314 Railway Exchange building, St. Louis, has been appointed representative for Missouri, northern Illinois and southern Kansas by the Alloy Products Corp., Waukesha, Wis.

W. F. Norton, 5606 Euclid avenue, Cleveland, has been appointed representative for the company for northern Ohio and western New York.

E. W. Buschman, the E. W. Buschman Co., 626 Broadway, Cincinnati, has been appointed the company's representative for southern Ohio, Kentucky, and portions of Indiana, Virginia and Tennessee.

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Evans Ward, vice president and general manager, Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., has been elected president and general manager of the company, succeeding the late William L. Ward. He has been associated with the organization since his graduation from Yale university in 1907. After several years at the Rock Falls, Ill., plant, he was made general manager in 1914 and vice president in 1923. He is vice president of the American Institute of Bolt, Nut and Rivet Manufacturers.

Warren L. Ward has been elected vice president. He has been with the company 25 years, and since 1917 has served as assistant sales manager. He was graduated from Yale in 1908.

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Charles J. Graham, formerly president of the Bolt, Nut and Rivet Manufacturers' association, has joined the staff of the Pressed Steel Car Co. as special representative with headquarters at the city office of the company in the Grant building, Pittsburgh. Mr. Graham, at the time of his affiliation with the bolt, nut and rivet association, which ceased to exist in May, 1931, also was vice president of the Pittsburgh Screw & Bolt Corp. His former company, Graham Bolt & Nut Co., of which he was vice president, merged with the Pittsburgh Screw & Bolt Corp. in 1929. Mr. Graham's experience has been largely in connection with railroad sales, and his activities with the Pressed Steel Car Co. will be along these lines.

Gas Association Elects

Herbert O. Caster, member of executive committee, Henry L. Doherty & Co., New York, was elected president of the American Gas association at the fifteenth annual convention of the organization held in Chicago, Sept. 25-29.

At the same time, John A. Fry, vice president, Detroit-Michigan Stove Co., Detroit, was elected to chairmanship of the manufacturers' section.

New Trade Publications

TURBINE PUMPS—Roots-Connersville-Wilbraham, Connersville, Ind., has issued Bulletin 260-B10 on regenerative turbine pumps, featuring the taper-edged impeller, advantages of which are fully described.

COMPRESSORS — Leaflet 2159 by Allis-Chalmers Mfg. Co., West Allis, Wis., is devoted to its single-stage water-cooled rotary air compressors and dry vacuum pumps. It is illustrated and contains engineering data.

POWER PRESSES—Niagara Machine & Tool Works, Buffalo, has issued bulletin No. 64-D on its double crank power presses, series 60. It is fully illustrated and ample data are presented.

METAL SPRAYING—The process and equipment used in spraying metal on various types of surfaces are described in a folder published by the International Metallizing association, 214 Provost street, Jersey City, N. J.

ALLOYS—Six sheets, constituting the third edition of a series of data sheets designed to give information on various alloys supplied in the form of centrifugal castings, have been published by the Shenango-Penn Mold Co., Dover, O.

FLOOR GRID—Truscon Steel Co., Youngstown, O., has issued its data book No. 5, a catalog of steel liner plate, containing engineering data, formulas for determining the proper thickness of metal and properties of the various products.

SAND MIXER—National Engineering Co., Chicago, has issued a general catalog of its intensive mixer for plastic and semiplastic mixing. It describes fully the operation and results attained, with specifications and detailed description of each size.

VARI-SPEED MOTOR PULLEY—Reeves Pulley Co., Cleveland, has issued a bulletin on its vari-speed motor pulley for simple and compact speed variation on small units. Operating principles and construction details are covered and illustrations supplement the text.

REFRACTORIES—A description of each refractory product made by the Standard Fuel Engineering Co., Detroit, is contained in a recent folder issued by that company. Information on where and how to use these refractory products is given.

CONTROLLED METAL — Spring City Foundry Co., Waukesha, Wis., has published a bulletin describing and illustrating the equipment utilized and practice followed in obtaining complete control of materials used in producng its line of gray castings.

SPEED REDUCER—Smith Power Transmission Co., Penton building, Cleveland, has published a bulletin on a single unit mechanical device incorporating the over-running clutch principle. The speed range of the reducer is from zero to 240 r.p.m.

WELDING RODS—American Manganese Steel Co., 389 East Fourteenth street, Chicago Heights, Ill., has published an illustrated bulletin on its nickel manganese steel welding rods, which may be used in the repair or reclamation of manganese steel castings.

AIR CONDITIONING—That a profit may inhere in proper air conditioning is one of the claims made by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., in a publication describing its line of equipment for properly conditioning air for shops, stores and offices.

VALVES—Jenkins Bros., 80 White street, New York, has published a 263-page catalog giving complete information on its line of valves and mechanical rubber goods, including types, patterns, sizes, list prices, weights and dimensions of bronze, iron and steel valves. A section also is devoted to engineering data.

SHEAVES — American Pulley Co., Philadelphia, has published a bulletin on sheaves, with full information on pulley sizes and corresponding belt sizes. This bulletin is compiled in response to requests for information from manufacturers of small machinery using fractional horsepower drives with V belts.

AIR COMPRESSOR—Ingersoll-Rand Co., 11 Broadway, New York, in a current bulletin describes its new type of air compressor which requires no cooling water, particularly adapted to use where water is scarce, costly or objectionable. A motor is built in. The compressor is 2-cylinder, 2-stage and cylinders and intercooler are air-cooled.

SAFETY STOPS—Electric Controller & Mfg. Co., Cleveland, in Bulletin 1035-A describes and illustrates the Youngstown safety limit stop for alternating and direct current motors. This has been revised to include information on enclosed-type resistors in addition to the open type in the previous bulletin. Ratings, dimensions and complete information on these stops has been added.

SOUND CASTINGS—Alpha-Lux Co. Inc., 192 Front street, New York, has published a folder describing Liquitol, a dry powder used to retard the cooling of hot-top metal. The material is applied by sprinkling over the surface of the molten metal in heads and runners. The folder presents results secured, gives instructions for using the A type material on alloy steel and the B type material on cast iron.

ELECTRIC FURNACES—Ajax Electrothermic Corp., Ajax Park, Trenton, N. J., has published a four-page folder describing and illustrating its 3 kilovolt-ampere equipment and its 35 kilovolt-ampere equipment, including converters, furnaces and equipment for heat treating. It is pointed out that with the 35 kilovolt-ampere equipment and a 17-pound furnace, 17 pounds of pure iron can be melted without presence of carbon and poured in forty minutes, starting with a hot furnace.

Construction and Enterprise

New York

NEW YORK—Bay Ridge Welding & Repair Co. Inc. has been incorporated with $10,000 capital to operate a machine shop, by Lynch & Hagan, 79 Wall street, New York.

NEW YORK—Siemens Inc. has been incorporated with $20,000 capital to operate a machinery business, by Hyman Walker, 299 Broadway, New York.

NEW YORK—American Bent Steel Co. Inc. has been incorporated with 100 shares no par value to manufacture iron, steel and copper products, by William Daunt, 110 East Forty-second street, New York, and associates.

New Jersey

BLOOMFIELD, N. J.—Victroc Inc. has been incorporated with $100,000 capital to deal in steel and iron, by Irwin Goldfinger, Bloomfield, N. J.

JERSEY CITY, N. J.—Kennard-Rafkin Machinery Corp. has been incorporated with $125,000 capital to manufacture air compressors, by Maurice J. Rafkin, Jersey City, N. J.

Ohio

CINCINNATI—C. A. Dykstra, city manager, plans construction of an incinerator plant, to cost about $100,000. J. E. Root, director of public works, in charge.

CLEVELAND—Rupp Forge & Shear Co. has been incorporated with 220 shares no par value, by Roy A. Doering, 5484 Broadway, Cleveland, and associates.

CLEVELAND—Eaton-Detroit Metal Co. has been incorporated with $250,000 capital, by Inglis & Sharp, Bulkley building, Cleveland, and associates.

COLUMBUS, O.—Hoster Brewing Co. is having plans prepared by Albert Kahn Inc., Detroit, for a brewery plant to cost about $300,000.

Michigan

DETROIT—Thermatic Appliances Inc. has been incorporated with $20,000 capital to manufacture heating and cooling devices, by Frank I. Taylor, 9050 Alpine avenue, Detroit.

DETROIT—Capital Pipe & Nipple Mfg. Co., 2762 West Jefferson avenue, has been incorporated with $5000 capital to manufacture plumbing supplies, by Oscar D. Berris, 1941 Virginia Park, Detroit.

DETROIT—City of Detroit and Michigan Central, Grand Trunk and New York Central railroads plan grade separation at Woodward avenue, providing elevated tracks over 120 feet of pavement, Federal government has allocated $575,000 to finance construction.

DETROIT—City of Detroit and the rapid transit commission, J. P. Hallihan, chief engineer, 735 Randolph street, have applied to the state administrative board for federal aid in financing under the RFC about 20 miles of subways, under Woodward avenue and across the city from Harper and Gratiot avenues to the Ford plant. City may vote on project Nov. 8.

GRAND RAPIDS, MICH.—Winged Home Trailer Corp. has been incorporated with 2500 shares no par value to manufacture automobile home trailers, by Bert Sprinkling, 1454 Paris avenue, Grand Rapids, Mich.

IRONWOOD, MICH.—Board of city commissioners has preliminary plans for a municipal electric light and power plant estimated to cost $900,000, for which financing will be sought.

ST. LOUIS, MICH.—Alma Mfg. Co., has been incorporated with $25,000 capital and 10,000 shares no par value to manufacture motor vehicles, by Frank W. Ruggles, Alma, Mich.

Indiana

ELKHART, IND.—K. & L. Mfg. Co. has been incorporated with 1000 shares of no par value to engage in general machine and manufacturing business, by J. W. Leipold, D. E. Stutzman and C. J. Kistler.

INDIANAPOLIS—Indianapolis Malleable Iron Co. Inc., 546 North Holmes avenue, has been incorporated to manufacture iron castings, by S. C. Wasson, R. S. Davis and Earl Buchanan.

INDIANAPOLIS—Eno, Cain Co. Inc. has been incorporated with 1000 shares no par value to manufacture printing presses and engraving machines, by Chauncey H. Eno, 1502 Merchants Bank building, Indianapolis, and associates.

Illinois

CHICAGO—Scientific Instruments Inc., 900 North Franklin street, has been incorporated with 4300 shares capital stock to manufacture scientific instruments and parts, by D. S. Levin, 1032 Cregier avenue, Chicago.

CHESTER, ILL.—City council is making plans for a municipal light and power plant for which a loan of $158,000 has been granted. W. A. Fuller Co., 2916 Shenandoah avenue, St. Louis, is engineer.

CHICAGO—Central Pattern & Foundry Co., 3737 South Sacramento avenue, is doubling its capacity by erecting a foundry building 100 x 200 feet for production of aluminum and bronze castings. The present plant is being operated 24 hours a day.

CHICAGO—ABT Art Metal Door & Window Co., 2651 West Roosevelt road, has been incorporated with 500 shares capital stock to manufacture hollow metal doors, windows and machinery, by Cousens & Godman, 201 North Wells building, suite 930.

CHICAGO—Dijon Air Conditioning Corp., 53 West Jackson boulevard, room 1635, has been incorporated with 100,000 shares capital stock to manufacture air-conditioning devices, by D. R. Murray, 518 Davis street, Evanston, Ill.

ELGIN, ILL. — Elgin Machine Works, North State street, Martin Skok president, has broken ground for an addition to cost about $15,000. The company manufactures piston pins and replacement parts for automobiles. The addition will give about 7000 square feet of manufacturing space, giving a total of about 20,000 square feet for the plant.

Southern States

SUMMERTON, S. C.—WaterWorks and sewerage plants are planned by the city, to cost about $77,000. State advisory board, T. B. Pearce chairman, has sent application to RFC for loan.

PARKERSBURG, W. VA.—Baldwin Tool Works is building a 1-story plant 60 x300 feet. O. B. Becker, 498 Union Trust building, Pittsburgh is in charge.

Missouri

ST. LOUIS—Board of public service, B. L. Brown president, city hall, will take bids soon for building deck and track construction of the East St. Louis union station, South Valley junction and St. Louis union depot railroad approaches to St. Louis municipal bridge across the Mississippi river. A loan of $700,000 has been granted by RFC to help finance. C. E. Smith & Co., 1930 Railway Exchange building, St. Louis, are consulting engineers.

Pacific Coast

SAN FRANCISCO—General Brewing Corp., C. W. Ahrens, director, plans construction of a brewing plant at Bayshore avenue and Third street, to cost $750,000. Fred H. Meyer, 525 Market street, is architect.

SELMA, CALIF.—City trustees have authorized a fund of $57,300 for construction of a municipal electric light and power plant with diesel engine-generator units; $106,000 for a waterworks system, including four new pumping units, elevated steel tank of 300,000 gallons capacity on steel tower 120 feet high, and other equipment. Edwin K. Hussey, Syndicate building, Oakland, Calif., is consulting engineer.

PORTLAND, OREG.—City council has appointed Harrison B. Eddy, engineer, Boston, to prepare plans for a proposed $8,000,000 sewage disposal plant, for which a federal loan will be asked. He will be assisted by J. W. Cunningham, R. G. Deick and Ray E. Koon, local engineers.

SEATTLE—Anderson Brake & Engine Co. has been incorporated with $50,000 capital, by V. C. Anderson and associates. Haight & Haight, Haight building, Seattle, are attorneys.